# LEGAL INFRASTRUCTURE AND URBAN NETWORKS FOR JUST AND DEMOCRATIC SMART CITIES

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*Abstract*

This article positions itself within the urban law and policy scholarship as a contribution to the creation of a subsection of this body of law, the urban law of services and assets. It shows that in three kind of urban infrastructure and networks (*i.e.* transport, energy, digital) there is growing attention towards a new general legal principle of urban law, the principle of tech justice which can be the center pillar of a more comprehensive legal infrastructure, the internet of humans. This legal infrastructure is necessary if public authorities want to design and shape just and democratic smart cities. Concepts like the Internet of Things, Internet of Everything and Internet of People suggest that objects, devices, and people will be increasingly inter-connected through digital infrastructure able to generate a growing gathering of data. At the same time, the literature on smart city and sharing city celebrate them as urban policy visions that by relying heavily on new technologies bear the promise of efficient and thriving cities. When addressing the impact of technological innovations, law and policy scholarship has either focused on questions related to privacy, discrimination, security, or issues related to the production and use of big data, digital public services, e-government. Little attention has been paid to the disruptive impact of technological development on urban governance and city inhabitants' rights of equal access, participation, management and even ownership, in order to understand whether and how technology can also enhance the protection of human rights and social justice in the city.

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**1. Introduction**

This article aims to shed light on the scarce attention paid to the disruptive impact of technological development on urban governance and city inhabitants rights and possibilities, in order to understand whether and how technology can also enhance the protection of human rights in the city. It carves the concept of Tech Justice building on the literature review and from the analysis of selected case studies. The article stresses the dichotomy existing between market-based and society-based applications of technology, the first likely to increase the digital divide and the challenges to human rights in the city, the latter bearing the promise to promote equal access to technology in the city.

The main argument advanced by this paper is indeed that Tech Justice is an empirical dimension that can steer the developments of smart city and sharing city policies toward a

more just and democratic city. Similar reflections are currently lacking in the literature on the smart and sharing city. This is undermining the potential of such innovations to promote human progress and human rights. The achievement of Tech Justice in the smart/sharing city may bring about the realization of the "Internet of Humans" (IoH), implying equal access to the Internet and in general access and other rights related to the technological developments for every human being. Only an IoH approach can bring about a just and democratic smart/sharing city. It is therefore urgent to embed social justice considerations (*i.e.* fairness, democracy, social and economic justice, equal access to digital infrastructures) in the analysis of tech-based visions of the city.

This argument is rooted in the article within the right to the city and commons-based governance approaches as applied to technological developments and in the theories of the city as commons. On the first approach, the right to the city is a concept introduced by the urban sociologist Henry Lefebvre in the late sixties[1]. Lefebvre observed the urban roots of social movements in the late Sixties in France and emphasized the active role of urban inhabitants in the struggle against capitalism as impacting the quality of urban life.[2] The concept of the right to the city is expressed by citizens' and social movements organization of protests and advocacy to reclaim more participation in the decision making process about the use of urban spaces and more generally in decisions that concern city planning[3]. The second above-mentioned approach, the "city as a commons" theory, which builds on the theory of the commons developed by Elinor Ostrom[4], advances the idea that different types of urban

[1] H. Lefebvre, *The Urban Revolution*, (1970); see also H. Lefebvre, *The Right to City*, in *Writings on Cities* 147 (1968).

[2] D. Harvey, *The Right to the City*, 27 Int'l J. Urb. & Reg'l Res. 939 (Susan Clark & Gary Galle eds., 2003); M. Purcell, *Excavating Lefebvre: The Right to the City and its Urban Politics of the Inhabitant*, 58 Geoj. 99 (2002). See also World Urb. F., World Charter On Right To The City (2004), http://abahlali.org/files/WorldCharterontheRighttotheCity-October04.doc; European Council Of Town Planners, *The New Charter Of Athens* (2003), http://www.ceu-ectp.eu/images/stories/download/charter2003.pdf.

[3] U. Mattei & A. Quarta, *Right to the City or Urban Commoning? Thoughts on the Generative Transformation of Property Law,* 1 Italian L. J. 2, 303, 305-306 (2015).

[4] E. Ostrom, *Governing the commons* (1990).

resources, including digital tools and technological infrastructures, mobility infrastructures, green areas, building, services of common interest can be governed as commons and the commons-based governance of those resources and services can be enabled and coordinated by urban public institutions at different level: from block, to neighborhoods and district to the City wide level[5].

Tech Justice within the commons theory can represent one of the most important empirical dimensions of the normative model of the urban governance model based on the reconceptualization of the city as a commons[6]. What we suggest is that looking back at Lefebvre and Ostrom the guiding and design principles to improving the governance of the tech city can be found. Furthermore, the promotion of self-organization, self-government and citizen participation should complement the discussion on the just tech city. Further research is needed in order to investigate deeper: the question on how to mediate the existing dichotomy between market-based and society-based tech developments; the empirical dimension of tech justice to drive the variation of smart city and sharing city policy and legal models toward a more just and democratic city. A fertile ground for future research includes also the need for: a reflection on the scale and scalability of such innovations; an understanding of the features, shape and scale more appropriate for institutions responsible for granting the right to a just tech city; an analysis of potential state and urban government reconfiguration and changing roles; a research on the role of the law and regulations in facilitating the just tech city; an assessment of the risk that the tech city would even worse the current 'surveillance society'. This article could not cover all these issues but has contributed to raising them and to laying the ground for further investigating the opportunity and challenges of embedding Tech Justice in the smart/sharing city discourse.

The issues of equal access and of the right to participate in decision-making processes, involvement in the management and

[5] S. Foster & C. Iaione, *The city as a commons*, 34 Yale L. & Pol'y Rev 281 (2016).
[6] S. Foster & C. Iaione, *Ostrom in the City: Design Principles and Practices for the Urban Commons,* in D. Cole, B. Hudson, J. Rosenbloom (eds.), *Routledge Handbook on the Study of the Commons* (2019).

ownership of urban-based new technologies are scarcely considered. This can arguably be due to the prevalence of an optimistic debate surrounding the smart transition. Smart technologies in cities have often been presented as technologies 'of liberation'. Nevertheless, the reality has often been different, with smart technology worsening inequalities and unbalance of power already existing before the smart transition. Along this line, Kim et al.[7] have argued how Smart Cities and Smart Home stand out as the 'most prominent' IoT applications, however missing the participatory component. Yet several authors developed arguments on the extent to which the IoT, applied to the Smart City paradigm, brings the potential (despite its numerous challenges) to improve citizens' health and wellbeing, stressing the importance of their direct involvement.[8] The promise is that people's inclusion in the smart transition's agenda will mitigate the risk of unequal and unjust smart society.

This article suggests that the 'Internet of Humans' notion could be applied to the discourses on the smart and sharing city in order to steer them towards a Tech Justice. This article builds on the idea of the Right to the City, first advanced by Henry Lefebvre[9] who observed the urban roots of social movements in the late Sixties in France and emphasized the active role of urban inhabitants in the struggle against capitalism as impacting the quality of urban life[10]. The concept of the Internet of Humans is presented as rooted in human rights literature and particularly on the Right to the City approach. Furthermore, the article

[7] T. Kim, C. Ramos & S. Mohammed, *Smart City and IoT,* 76 Future Generation Computer Sys. 159 (2017).

[8] A. Berti Suman, *In Search for the Value of Connectivity: Accountable Citizens Fostering Accountable Governance via Connectivity*, IEEE International Conference on Cloud Engineering Proceedings (2017).

[9] H. Lefebvre, *The Urban Revolution*, (1970); see also H. Lefebvre, *The Right to City*, cit. at 1.

[10] D. Harvey, *The Right to the City*, 27 Int'l J. Urb. & Reg'l Res. 939 (Susan Clark & Gary Galle eds., 2003); Mark Purcell, *Excavating Lefebvre: The Right to the City and its Urban Politics of the Inhabitant*, 58 Geoj. 99 (2002). See also World Urb. F., *World Charter on Right to the City* (2004), http://abahlali.org/files/WorldCharterontheRighttotheCity-October04.doc; European Council Of Town Planners, *The New Charter Of Athens* (2003), http://www.ceu-ectp.eu/images/stories/download/charter2003.pdf.

proposes the Theory of the Commons[11] as a governance approach that can bring Tech Justice into the smart and/or sharing city discourses. Despite the connection existing between smart city/sharing city applications and human rights in cities, existing application of the IoT to the smart and sharing city do not attribute sufficient space to discussion of the issue of rights to the city inhabitants and to local communities to participate, shape the decisions on the infrastructure or services provided.

It seems worthwhile to reflect on David Harvey's[12] recently proposed model, which derives from the application of the Right to the City approach. David Harvey,[13] who in the footsteps of Lefebvre introduced the concept of Rebel Cities, highlighted that the anti-capitalist struggles of urban revolutionary movements in the rebel cities, as happened in New York City with the 'Occupy Wall Street Movement', are attempts to reclaim a 'collective right to the city'. Episodes of urban riots and urban conflicts have deep and multidimensional causes. The author observed urban social movements protesting against financial speculation and economic globalization in the European Union and the US. Consequently, Harvey's advanced the concept of the rebel city. In Harvey's view, the "rebel cities" are those cities where urban social movements carry out an active resistance against the process of capitalist urbanization through conventional or unconventional forms of participation and protest. Episodes of urban riots and urban conflicts have deep and multidimensional causes. What here is assumed is that inequalities in income distribution and job opportunities in the cities might profoundly affect a city and create fractures. The technological developments may either reinforce or mitigate this trend, depending on whether the principle of Tech Justice is properly implemented.

The failure to address the issue of justice in the (smart/sharing) city has been recently been counterbalanced by an emerging scholarship stressing the role of citizen's rights in the city, the need for a citizen-centered urban transition as well as the search for an empirical study of the city. This scholarship

[11] E. Ostrom, *Governing the Commons: The Evolution of Institutions for Collective Action* (1990).

[12] D. Harvey, *Rebel Cities: From The Right to The City To The Urban Revolution* (2012).

[13] D. Harvey, *The Right to the City*, cit. at 1.

(which will be explored in section 2 of this article) is identified with the literature on human rights cities and the more recent literature on commons-based cities. Both streams of thought advance the notion of urban justice through similar approaches (participation and co-creation). They also share the quest for an empirical grounding of these theories.[14] However, there is a lack of connection between the two scholarships. By filling the gap between these two bodies of literature, we intend to contribute to existing strands of thoughts by advocating for empirically grounded studies of urban governance theories that a fairer technological transition in the city.

The article is divided in three sections. Section 2 raises the issue that the dominant discourses surrounding the notions of the IoT and IoX do not take into account issues of fairness, democracy, social and economic justice. The article then reviews the literature on the tech-based platform city: the smart city and the sharing city, underling the justice gap in these discussions. The notion of the Internet of Humans advanced in this article implies bringing Tech Justice and therefore human rights talk and commons-based approaches to the smart and sharing city. The article finally positions the concept of 'Tech Justice' within the legal scholarship that investigated whether cities should have a role in safeguarding human rights. The main challenges arising in urban context in terms of human rights the legal, philosophical, sociological and political science approaches that build the concept of a right to the city approach are investigated in connection with the tech development. Section 3 introduces and operationalizes the concept of Tech Justice and its foundations. The operationalization of the dimension of Tech Justice shows the extent to which it is a matter of an incremental dimension, ranging across four sub-dimensions: access and distribution; participation, co-management; and co-ownership. Section 4 introduces case studies from four urban policy siloes: urban digital networks, urban data, urban energy, urban mobility. For each area, we offer a brief description and an example or some case studies that illustrate different aspects relevant for the dimension of Tech Justice. Finally, section 5 discusses the results of the empirical overview of the relevant

[14] B. Oomen et al., *Global Urban Justice. The Rise of Human Rights Cities* (2016).

case studies where the concept of Tech Justice has emerged and offers concluding remarks that advance the hypothesis that the commons approach (in light of the studies carried out by scholars on the commons on urban, digital and infrastructure commons) could enhance technological justice in the governing of tech infrastructure and services, tackling the barriers to equal access to technology in the city and therefore delivering a more just and democratic smart city.

## 2. Internet of Things, Internet of Everything and Internet of People

The term "Internet of Things" was coined by Kevin Ashton[15] to describe a huge array of new consumer devices (e.g. mobile phones, tablets, watches, cuffs, headbands, helmets, etc.) tracking, measuring, recording, and analyzing different personal aspects of daily life (e.g. steps taken in a day, calories burned, heart rate, blood pressure or blood glucose levels, hours asleep, soccer performance, daily exposure to ultraviolet rays, need to reapply sunscreen, blood flow, oxygen saturation when cycling, baby's sleep habits, temperature, and breathing patterns, changes in autonomic nervous system to detect mental state (e.g., passive, excitable, pessimistic, anxious, balanced) and ability to cope with stress, brain activity to track the ability to focus, etc.[16].

In addition, home-automation systems, driving and automobile monitors, new lines of connected ovens, refrigerators, and other appliances, home electricity and water-usage trackers measure driving habits, kitchen-appliance use, home electricity and water consumption, and of course work productivity. The exponential growth of mobile data traffic - which in 2012 was almost twelve times larger than all global Internet traffic was in 2000 -[17] is essentially driven by intelligent devices and sensors[18]

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[15] *See* K. Ashton, *That "Internet of Things" Thing,* RFID J. (June 22, 2009), http://www.rfidjournal.com/articles/view?4986 (last visited March 26th, 2009); *see also* K. Finch & Omer Tene, *Welcome to the Metropticon: Protecting Privacy in a Hyperconnected Town,* 41 Fordham Urb. L.J. 1581, 1599 (2014).

[16] S. R. Peppet, *Regulating the Internet of Things: First Steps Toward Managing Discrimination, Privacy, Security and Consent*, 93 Tex. L. Rev. 85, (2014).

[17] *See* Cisco, *Cisco visual networking index: global mobile data traffic forecast update,* http://www.cisco.com/en/US/ solutions /collateral /ns341

belonging to the Internet of things technology.

The Internet of Things usually raises questions related to the ownership of the data these sensors generate, the use that these data receive, the security of devices, consumers' awareness about the legal implications. The dominant discourses surrounding the notions of the IoT, IoX do not take into account issues of fairness, democracy, social and economic justice. It is to demonstrate this argument if we "urbanize" these questions and have a quick look at the conversation around smart and sharing cities, which are the two dominant narratives which intersect data and the city.

**2.1 The smart city and the sharing city as two different implementations of the model of tech-based platform city.**

In the academic literature focused on the development of a normative model of the city governance, we identified the paradigm of the tech-based city, reflecting the smart and the sharing city models. The concepts of smart city and sharing city sometimes overlap both in the public debate and in the scientific literature as well as at the public policy level[19]. This section introduces and explains the two models more closely related to the scope of this Article.

The concept of smart city is becoming increasingly popular in both scientific literature and policy making arena. Initially, the concept of smart city was referred to the increasing relevance of ICT infrastructures in the city. Recent definitions entail that the smart city is a city where communities, institutions, infrastructure, devices and objects are interconnected and integrated by technology, they are sustainable and respond in a smart way to the challenges posed by the urban context[20]. The

/ns525/ns537/ns7O5/ns827/white paperc1 1-520862.pdf (last visited March 6, 2018).

[18] D. Evans, *How the Internet of Everything Will Change the World ... for the Better #IoE [Infographic],* Cisco Blogs (Nov. 7, 2012), http: //blogs. cisco.com/news/how-the-internet-of-everything-will-change-the-worldfor-thebetter-infographic (last visited March 6, 2018).

[19] A. Miller, *Amsterdam is now Europe's first named "Sharing City"*, in *Shareable* (February 24, 2015), https://www.shareable.net/blog/amsterdam-is-now-europes-first-named-sharing-city. (last visited March 6, 2018).

[20] V. Albino, U. Berardi and R. M. Dangelico, *Smart Cities: Definitions, Dimensions, Performance, and Initiatives,* 22 J. of Urban Technology, 3-21 (2015).

field of the study of the law and the smart city is just emerging[21]. This despite the fact that there are several legal and policy issues that might be addressed: privacy protection[22], security, law enforcement access and insurance[23], among the others. Several observers of the smart city admonish us to reflect over the wider implications of the technological evolution of cities. The increasing dependence of cities on technology makes them functional and equitable, but also exposed to vulnerabilities[24] (i.e.to potential hacker attacks).It was observed that a smart transition of the city provides city inhabitants with a window of opportunity to express their civic activism at best, but it might at the same time fuel already existing conflicts in socially and economically stratified cities[25] and deepen social divisions[26].

Similarly, the sharing city relies heavily on ICT technologies and data, but it has its own peculiar features. According to Ageyman and McLaren, the distinction is clear: the smart city should be conceived as a means to reach the sharing city[27]. Consequently, the transition towards the smart city should be the starting point and the precondition for achieving a sharing city. The dominant vision of the sharing city is based on the most diffused understanding of the sharing economy as a "crowd-based capitalistic city" that relies heavily on the use of sharing technologies and platforms to create value from the human and material capacity available in the city, as proposed by Arun

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21 D. Glancy, *Sharing the Road: Smart Transportation Infrastructure,* 4 Fordham Urb. L. J. 1617( 2014).

22 K. Finch & O. Tene, *Welcome to the Metropticon: Protecting Privacy in a Hyperconnected Town,* 41 Fordham Urb. L. J. 1581, 1599 (2014).

23 D. Glancy, *Sharing the Road: Smart Transportation Infrastructure,* 4 Fordham Urb. L. J. 1617(2014).

24 A. Townsend, *Smart Cities: Big Data, Civic Hackers, and the Quest for a New Utopia* (2013).

25 A. Townsend et al., *A planet of civic laboratories: the future of cities, information and inclusion,* Institute for the future of cities, Palo Alto Calif., http://www.iftf.org/our-work/global-landscape/cities/the-future-of-cities-information-and-inclusion/ (last visited 10 April 2018).

26 R. Hollands, *Will the real smart city please stand up?* 12 City, 303 (2008).

27 D. Ageyman & J. Mc Laren, *Sharing Cities. A Case for Truly Smart and Sustainable Cities* (2015); A. Miller, *Interviewed: "Sharing Cities" Authors Duncan McLaren and Julian Agyeman*, in *Shareable* (March 23, 2016), https://www.shareable.net/blog/interviewed-sharing-cities-authors-duncan-mclaren-and-julian-agyeman. (last visited March 6, 2018).

Sundarajan.[28] Conversely, the definition of sharing city provided by McLaren and Ageyman acknowledges this distinction. In the sharing city, capitalism would be replaced by more value-oriented businesses. The technology is still considered as a crucial infrastructure in the sharing city, but it is not conceptualized as merely profit-oriented, being considered as a tool for building resilient and healthy communities.[29] The rise of the sharing economy can possibly be understood, in the view of Nestor Davidson and John Infranca, as a reaction to the current profit-oriented landscape of the smart city's governance[30], where often the market dominates the scene. In the present contribution, we acknowledge the importance of moving from a market-based smart and sharing city to a citizen-centered, values-oriented city.

### 2.2 The Internet of Humans: bringing Tech Justice to the City

This section explores the foundation of the principle of Tech Justice, building on the literature on human rights and technology, human rights in the city, the Right to the City and studies that analyzed justice and equality issues in connection with technology. The ultimate aim is to build a "Right to Tech in the city" as the legal content of a principle of Tech Justice which should inspire the design of an institutional and policy infrastructure supporting the Internet of Humans and complementing the digital infrastructure of IoT, IoE or IoX, IoP.

The relationship between human rights and technology as a declination of the more complex relationship between law and technology is crucial for a just social and economic development throughout the world. The challenges of the interplay between human rights and technology have been widely discussed by policy makers and scholars, scientists and lawyers. From a law and policy perspective, there are several issues concerning this relationship. First of all, one should consider the disruptive impact of technology on human rights. Those includes air pollution produced by industrial developments which lead to the violation of interests protected by law to live in environment free

[28] A. Sundarajan, *The Sharing Economy* (2015).
[29] D. Mc Laren & J. Ageyman, *Sharing Cities* (2015).
[30] N. Davidson & J. Infranca, *The sharing economy as an urban phenomenon*, 34 Yale L. & Pol'y Rev. 238 (2016).

from contamination[31]; the potential threat to the right to privacy[32] and to freedom of expression[33] due to the development of surveillance technologies; the potential threat represented by the growth of biotechnology[34] and by scientific discoveries in the field of nuclear physics[35].

There has been an increase in law making activity by the United Nations on this matter addressing both the issue of the access to technology as a human right[36] and the safeguard of human rights. Already in 1968, with the Proclamation of Teheran later adopted as a resolution, the UN declared that "while scientific discoveries and technological advances have opened up prospects for economic, social and cultural progress such developments may nevertheless endanger the rights and freedom of individuals and will require continuing attention"[37]. In current times, UN issued policy reports on the right to privacy, the gender digital divide[38] from a human rights perspective and on the normative framework applicable to the right to enjoy the benefits of scientific progress and its applications. In the latter, it is also addressed the key point that international human rights law did not recognize a general right to access the internet, but it is nevertheless possible to find an existing right to the internet for persons with disabilities based on the provisions of articles 4, 9,

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[31] Y. Dinstein, *Science, technology and human rights,* 5 Dalhousie L. J. 155 (1979).

[32] F. Fabbrini, *Human Rights in the Digital Age: The European Court of Justice Ruling in the Data Retention Case and Its Lessons for Privacy and Surveillance in the United States,* 28 Harv. Hum. Rts. J. 65 (2015).

[33] N. Lucchi, *Internet Content Governance and Human Rights,* 16 Vand. J. Ent. & Tech. L. 809 (2014).

[34] T. Murphy, *Human Rights in Technological Times,* in Roger Brownsword, E. Scotford & K. Yeung (eds.), *The Oxford Handbook on the Law and Regulation of Technology* (2017).

[35] M. Kirby, *Human rights and technology: a new dilemma,* 22 U. Brit. Colum. L. Rev. 123 (1988).

[36] T. E. Frosini, *Access to internet as a fundamental human right,* 5 Italian J. Pub. L. 226 (2013).

[37] G. Brand, *Human rights and scientific and technological development,* 4 Human Rights Journal 351 (1971); *General Assembly Resolution, 2450 (XXIII)* 19 December 1968.

[38] Human Rights Council, Annual report of the United Nations high commissioner for human rights, 35/9, *Promotion, protection and enjoyment of human rights on the Internet: ways to bridge the gender digital divide from a human rights perspective,* 5 May 2017.

21, and 30 of the Convention on the rights of persons with disabilities[39]. The report concluded that the right to enjoy the benefit of scientific progress is a largely neglected right despite its importance for the enjoyment of other human rights and fundamental freedoms in the modern world and impediments to access to information, technology and knowledge are identified mainly in poverty and discrimination[40]. In a resolution of 2016 that recalls all those achievements and relevant resolutions, the UN "decides to continue its consideration of the promotion , protection and enjoyment of human rights as well as of how the Internet can be an important tool for fostering citizen and civil society participation, for the realization of development in every community and for exercising human rights[41]".

**2.3 Human rights and the city**

There are two streams of thought that discuss the intersection between human rights and the city: the human rights cities approach and the right to the city approach.

The literature on human rights and the city currently revolves around issues like the choice between universalistic versus adaptive approaches, top-down versus bottom-up processes of implementation, the dialogue and the confrontation of different priorities between civil society and local governments.[42] Two

[39] Report of the United Nations High Commissioner for human rights. *Report on the seminar on the rights to enjoy the benefits of scientific progress and its applications*, 1 April 2014.

[40] Report of the United Nations High Commissioner for human rights, *Report on the seminar on the rights to enjoy the benefits of scientific progress and its applications*, 1 April 2014, at 13.

[41] General Assembly resolution 32/L. 20, at 4. This approach seems to stress a connection between the right to Internet and the right to development, as already highlighted by Jennifer Myers, *Human rights and development: using advanced technology to promote human rights in Sub-saharan Africa*, 30 Case W Res. J. Int'l L. 343 (1998) and A. J. Cerda Silva, *Internet Freedom is Not Enough: Towards an Internet Based on Human Rights,* 18 Int'l J. on Hum Rts. 17 (2013). The IoT can also facilitate city residents' self-production of energy, use of driverless cars and manufacturing and distributing goods, enabling sharing economy to flourish at a very low or zero marginal cost. See also J. Rifkin, *How the Third Industrial Revolution will create a Green Economy,* 3 IET engineering & technology, 7, 26-27 (2008); Jeremy Rifkin, *Towards Internet of Things and shared economy*, 2 Corporation Research 14-21 (2015).

[42] B. Oomen et al., *Global Urban Justice. The Rise of Human Rights Cities* cit at 14.

main streams of thought have emerged: the Human Rights Cities approach and the Right to the City approach[43]. Human Rights Cities literature has been inspired by single cities or cities' networks policy initiatives such as: the Montreal Charter on Rights and responsibilities, the Mexico City Charter for the Right to the City, the European Charter for the Safeguarding of Human Rights in the City (ECHRC)[44] or the Global Charter Agenda for Human Rights in the City[45] promoted by United Cities and Local Governments (UCLG), as well as the NGO-driven initiatives like the Rosario and other 17 cities proclamations promoted by the NGO People's Movement for Human Rights Learning (PDHRE)[46].

Skepticism about the real implementation and feasibility of these urban human rights based policies has given rise to the need to engage with empirical analysis in assessing implementation of urban laws and policies based on human rights. At this stage, however, empirical approaches and evidence on the success of a Tech Justice-based city are still scarce.[47] In addition, Human Rights Cities literature recently suggested the need to concentrate further research on the role of social practices in shaping these discourses in the city and their implementations. According to this approach, laws and policies on human rights cities are not to be conceived as isolated from the context that can shape them (i.e. socio-cultural legacies) and should not be analyzed without an analysis of the social practices that produce them[48]. We support this body of though as we deem a context-

[43] E. Chueca, *Human rights in the city and the right to the city: two different paradigms confronting urbanization*, in B. Oomen et al., *Global Urban Justice. The Rise of Human Rights Cities* cit at 14.

[44] *European Charter for the Safeguarding of Human Rights in the City* (ECHRC) signed in Saint Denis in 2000 after two years of debate between European Cities, civil society organizations and human rights experts https://www.uclg-cisdp.org/en/right-to-the-city/european-charter (last visited 06 Apr. 2018).

[45] UCLG, *Global Charter Agenda for Human Rights in the City,* https://www.uclg-cisdp.org/en/right-to-the-city/world-charter-agenda (last visited 06 Apr., 2018).

[46] S. Marks et al., *Human rights cities civic engagement for societal development* (2008).

[47] M. Grigolo, *Human rights and cities: the Barcelona Office for Non-Discrimination and its work for migrants*, 14(6) Int. J. of Hum. Rts. 894-912 (2010).

[48] M. Grigolo, *Towards a sociology of the human rights city: focusing on practice,* in B.

dependent research agenda indispensable to the implementation of appropriate laws and policies in the city.

The second stream on thought envisions a rights-based approach to technology in the city, a completion from what is named the "Right to the City" approach, presented widely in chapter 2, to a concept of Right to Tech in the City. What here is assumed is that, as recognized by the right to the City literature, inequalities in income distribution and job opportunities in the cities might profoundly affect a city and create fractures. The technological developments may either reinforce or mitigate this trend, depending on whether the principle of Tech Justice is properly implemented.

Joe Shawn and Mark Graham discussed the application of the right to the city approach to technology, particularly in regard to the access to information in order to achieve a fairer geography of information in the city[49]. The starting point of the authors' argument is that ubiquity of digital information and communication technologies (ICTs) producing and distributing the abstract urban space is central to the reproduction of urban space as conceptualized by Lefebvre[50]. Kitchin and Dodge, for instance, analyzed the ways that computer code can shape how spaces are brought into being[51]. Mark Graham earlier pointed to the ways that digital information can augment spatial experiences[52].

The conceptualizations provided by those authors of the spatiality of code and content serve as a starting point to reflect upon the problematic entanglements between digital information and a Lefebvrian understanding of abstract space. Mobile applications related to access to information and transportation such as Wikipedia or Uber and, in general, the actor of digital and tech companies are gaining increasing power, that is also

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Oomen et al., *Global Urban Justice. The Rise of Human Rights Cities* cit at 14.

[49] J. Shaw & M. Graham, *An Informational Right to the City? Code, Content, Control, and the Urbanization of Information*, 49 Antipode 907 (2017).

[50] H. Lefebvre, *The Right to City*, in *Writings on Cities* 147 (1968).

[51] R. Kitchin & M. Dodge, *Code/space: Software and Everyday Life* (2011).

[52] M. Graham, *The Virtual Dimension*, in M. Acuto and W. Steele (eds.), *Global City Challenges: debating a concept, improving the practice* (2013), at 117-139.

overcoming that power usually attributed to traditional urban actor-developers, planners and landlords[53].

### 2.4. Justice and equality in the tech field, especially at the local level

Artificial Intelligence and blockchain are two examples of a disruptive technology that promises to generate strong legal innovations within the fields of administrative decision making and public contracts or services. These technologies are still in their infancy so their analysis cannot yet be exhaustive, however many already anticipate the need for a human rights based approach that will allow for the proper deployment of more advanced technologies while furthering the respect for basic, essential, fundamental rights.

The quest for an AI for social good is probably due to this rising conversation. With the newly announced initiative by Mc Kinsey and Google[54], policy-oriented uses of Artificial Intelligence have taken center stage.

In addition, the EU has produced Ethical Guidelines for AI based on the notion of "Trustworthy AI" and the more recent White Paper On Artificial Intelligence where the concept of trust is a center pillar[55]. The partnership between the Blockchain Charity Foundation (BCF) and the UNDP goes in the same direction. BCF has unveiled its goal to utilize AI in the aid for economic development and in strongly contributing to reach the SDGs.[56]

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[53] J. Shaw & M. Graham, *An Informational Right to the City? Code, Content, Control, and the Urbanization of Information*, 49 Antipode 907 (2017).

[54] See McKinsey Global Institute, *Notes from the AI frontier. Applying AI for Social Good*, in https://www.mckinsey.com/~/media/McKinsey/Featured%20Insights/Artificial%20Intelligence/Applying%20artificial%20intelligence%20for%20social%20good/MGI-Applying-AI-for-social-good-Discussion-paper-Dec-2018.ashx. See also Google, *Advancing AI for everyone*, in https://ai.google.

[55] High-Level Expert Group On Artificial Intelligence, *Ethics Guidelines For Trustworthy AI*, in https://ec.europa.eu/digital-single-market/en/news/ethics-guidelines-trustworthy-ai (last visited 30 January 2020). See now European Commission, *White Paper On Artificial Intelligence. A European approach to excellence and trust*, Brussels, 19.2.2020 COM(2020)65.

[56] UNDP, *Blockchain Charity Foundation and UNDP Announce Partnership to Explore Blockchain for Social Good,* 25 September 2018, in www.asia-

The issue of a rights-based approach to regulation of new technologies in cities is contemplated in the literature on smart cities by focusing the attention on the challenges posed to privacy protection[57]. Only a part of the scholarship highlighted the impact of new technologies in cities on its economic and democratic functioning.

Some authors put a spotlight on the current business models of sharing economy. Blockchain, for instance, could facilitate peer-to-peer cooperation for ride sharing eliminating the need for an intermediate platform such as Uber or Lyft or for the self-production and exchange of energy in the urban energy smart grids[58].

Olivier Sylvain has defined "broadband localism"[59] an approach that seeks to overcome broadband infrastructure and service disparities by race, ethnicity and income. The author suggests that regulators should go beyond "network neutrality" to achieve "network equality"[60] meaning substantive equality in technology access.

Brett Frischmann argued that the diffusion of digital platforms and information technology, producing techno-social engineering of humans[61] largely ignored by legal scholars, might represent one of the greatest constitutional issues caused by the spread of technology, because it could make people behave like machines and arguably becoming predictable and programmable.[62]

From different standpoints, authors focusing on platform cooperativism[63] are stressing the attention on the issue of the

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pacific.undp.org/content/rbap/en/home/presscenter/pressreleases/2018/blockchain-charity-foundation-and-undp-announce-partnership-to-e.html.

[57] I. Brown, *Keeping our secrets? Designing internet technologies for the public good*, E.H.R.L.R. 4, 369-377 (2014).

[58] M. Finck, *Blockchains: regulating the Unknown,* 19 German L. J. 665 (2018).

[59] O. Sylvain, *Broadband localism*, 73 Ohio St. L. J. 795 (2012).

[60] O. Sylvain, *Network equality*, 67 Hast. L. J. 103 (2016).

[61] B. Frischmann, *Thoughts on Techno-Social Engineering of Humans and the Freedom to Be Off (or Free from Such Engineering)* Theoretical Inquiries L. 17, 535 (2016).

[62] B. Frischmann, *Thoughts on Techno-Social Engineering of Humans and the Freedom to Be Off (or Free from Such Engineering)*, cit. at 535.

[63] T. Scholtz, *Platform Cooperativism. Challenging the Corporate Sharing Economy*, Report of the Rosa Luxemburg Foundation, in http://www.rosalux-

safeguard of workers' rights in the digital economy governed by big tech companies and platforms providing services. Diane Ring and Shu Yi Oei[64] highlighted the regulatory ambiguity deriving from the situation of the workers of sharing platforms. Furthermore, an emerging strand of literature is focusing the attention on the issue of human rights and technology in cities starting from the angle of the discrimination in the access to the Internet. There are concerns about discrimination in ride-sharing and home-sharing platforms due to, among other reasons, more intimate nature of sharing economy transactions, which increase the salience of gender and limits the law's ability to control these adverse effects.[65] The diffusion of the sharing economy is arguably bringing about a diffused disparity of power, which should be taken into account in promoting such approaches.[66] The previously discussed aspects are only selected examples of the debates ongoing on technological developments and human rights concerns. However, they contribute to illustrate some of the challenges of the ongoing tech transitions in the city.

### 3. Investigating the dimensions of Tech Justice in the City

Building on the literature about human rights and Technological Justice is a dimension that measures the potential to access, participate, co-manage and co-own technology and digital infrastructures and services in the City. Tech justice is built on the paradigm of the shift from formal equality to substantial equality[67]. It is rooted in part in the idea of human

nyc.org/platform-cooperativism-2/, (January 2016) (last visited 30 October 2018).

[64] S. Oei & D. M. Ring, *Can Sharing Be Taxed?*, 93 (4) Wash. U. L. Rev. (2016).

[65] N. Schoenbaum, *Gender and the Sharing Economy*, 43 Fordham Urb. L.J. 1023, 1070 (2016).

[66] See the analysis of the disparity of power through a contracts survey carried out by G. Smorto, *Protecting the weaker parties in the sharing economy*, in N. Davidson, M. Finck & J. Infranca (eds.), *Cambridge Handbook on Law and Regulation of the Sharing Economy* (2018).

[67] Leonardo Morlino introduced a model of quality of democracy that provides both procedural dimension, such as the rule of law and substantive dimensions such as equality. Amon the dimensions of the quality of democracy, the dimension of the rule of law and in particular the sub-dimension of institutional capacity could be helpful to measure the role of the state and the efficiency of

capacity and well-being[68] and in recognition of structural inequalities. Tech Justice is conceived as a tool for facilitating and sharing information and building capabilities that are necessary for urban wellbeing. The concept aims at developing targeted actions to grant vulnerable minorities and *disadvantaged* populations access to the benefits deriving from technology.

The dimension of Tech Justice is also a tool for measuring the implementation of the international policy agenda set forth within the framework of Open Government[69] operationalized through the realization of democratic platforms that enables collaboration between local actors and governments. The collaboration variable is a key variable in the Open Government agenda, yet poorly implemented by state-of-the-art country policies in the EU[70].

The tech justice dimension brings the perspective of the urban co-governance to the use, management, ownership of technological infrastructures and tools in cities. The literature on collective action and the commons Elinor Ostrom solidly contributed to the definition of the concept of social capital, activation of collective action and the understanding of its functioning in complex situations regarding commons pool resources. Ostrom, together with Ahn, identified the key element of trust in trustworthiness, the focus on other's intrinsic motivation, as the link that activates the evolution from social capital to collective action. Ostrom and Ahn also examined the role of rules, both legal rules and social rules, as crucial in democratic societies to understand the concrete functioning of social capital[71]. Literature on commons- based cities and the urban commons in general is very recent. The urban commons literature emerged from Elinor Ostrom's empirical research on

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the public administration in implementing an equal fair access to technology, also in cities, L. Morlino, *Changes for democracy* 196-199 (2011).

[68] M. Nussbaum & A. Sen, *The quality of life* (1993).

[69] B. Noveck, *Wiki government: how technology can make government better, democracy stronger and citizens more powerful* (2009); D. Lathrop & L. Ruma (eds), *Open Government: Collaboration, Transparency, and Participation in Practice* (2010).

[70] E. De Blasio & D. Selva, *Why choose open government? Motivations for the adoption of open government policies in four European countries,* 8 Pol'y & Internet (2016).

[71] E. Ostrom & T. K. Ahn, *Foundations of social capital* (2003).

Common Pool Resources (CPRs)[72] which demonstrated that a cooperative governance strategy was a viable way of dealing with CPRs dilemma, avoiding the tragedy of the commons. Ostrom identified the conditions or principles which increase the likelihood of long-term, collective governance of shared resources. Although these principles have been widely studied and applied to a range of common pool resources, including natural and digital commons, there has not been enough research aimed at applying them to the urban commons. The only exception is represented by Harini Nagendra and Elinor Ostrom.[73] They applied the institutional analysis and development IAD framework of institutional analysis to the governance of natural resource in cities such as Bangalore. Their aim was to apply Ostrom's design principles in the peri-urban and urban context. The urban commons are also addressed in the sociological or anthropological strand of literature on activation of forms of collective action and political protest for reclaiming urban commons as a reaction against the impact of financialization and the post-2008 economic crisis[74]. These analysis stress on one side relational process of collaboration – not focusing only on the commons as shared resources, but also as a process of social cooperation – and on the other side on the way they reconfigure the relationship between urban social movements and public institutions and investigate the dynamics of production of urban commons as a social practice[75]. These aspects also relate to some of the case studies of policies and governance innovations that this article is capturing. The strand of research that is focusing on the urban commons merges this literatures with the common pool resources literature, extending Ostrom's methodology not to natural resources in the city, but to

[72] E. Ostrom, *Governing the commons* (1990).

[73] H. Nagendra & E. Ostrom, *Applying the social-ecological system framework to the diagnosis of urban lake commons in Bangalore, India,* Ecology & Soc'y 19(2): 67. (2014).

[74] M. Garcia Lamarca, *Insurgent acts of being-in-common and housing in Spain: Making urban commons?*, in M. Dellenbaugh et al. (eds.), *Urban commons: moving beyond state and market* (2015); see also A. Kioupkiolis, *The Common and Counter-Hegemonic Politics. Rethinking Social Change* (2019).

[75] M. Dellenbaugh et al, *Urban commons: moving beyond state and market* (2015); C. Borch & M. Kornberger, *Urban Commons: Rethinking the City* (2015).

the governance of constructed and regulated resources in the city. Legal scholar Sheila Foster[76] first inquired whether there are identifiable urban commons governance institutions existing in cities, such as community gardens or business improvement districts. It has been also questioned whether through a commons-based approach to the governance of shared spaces and urban services it would be possible to envision the city itself as a commons[77]. To say that the City is a commons means recognizing that "the city shares some of the classic problems of a common pool resource—the difficulty of excluding people and the need to design effective rules, norms and institutions for resource stewardship and governance"[78]. The city as a commons concept recognizes that the City shares some features with the typical common pool resources but also entails relevant distinctions. For instance, the fact that although there are many resources that are non-exhaustible and non-renewable (i.e. rivers) the majority of resources and services in the city are constructed commons, resulting from social processes and institutional design. What marks a great difference is also the fact that cities are context characterized by high political and legal complexity. As a result, the city as a commons theory ultimately adapted Ostrom's design principles to the urban context and proposed five design principles (collective governance; enabling state; experimentalism; pooling economies and tech justice) that represent the types of conditions and factors that "instantiate the city as a cooperative space in which various forms of urban commons not only emerge but are sustainable"[79].

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[76] S. Foster, *Collective Action and the Urban Commons*, 87 Notre Dame L. Rev. (2011), 57.

[77] C. Iaione, *The tragedy of urban roads. Calling on citizens to combat climate change,* Ford. Urb. L. J. (2010); C. Iaione, *Governing the urban commons,* Italian J. Pub. L. (2015); C. Iaione, *The Co-City: Sharing, Collaborating, Cooperating, and Commoning in the City*, 75 Am. J. Econ.& Soc. 415 (2016); C. Iaione, *The right to the co-city*, Italian J. Pub. L. 80 (2017); C. Iaione & E. De Nictolis, *Urban Pooling*, 44 Fordham Urb. L.J. 665 (2017).

[78] S. Foster & C. Iaione, *Ostrom in the City: Design Principles and Practices for the Urban Commons*, in D. Cole, Blake Hudson, Jonathan Rosenbloom (eds.), *Routledge Handbook on the Study of the Commons* (2019), at 235.

[79] S. Foster & C. Iaione, *Ostrom in the City: Design Principles and Practices for the Urban Commons*, cit. at 237.

In analyzing tech justice, we can make use of the common methodological concepts of dimension/sub-dimension and scale. These concepts enable us to explain tech justice more clearly and to better understand the fact that tech justice is an essential dimension of urban collaborative city governance. Therefore, this article identifies four dimensions in the notion of Tech Justice, namely Access and Distribution; Participation; Co-management; and Co-ownership. Each dimension is investigated in the context of the Tech Justice discourses and of the cases analyzed. The variable is built on an incremental co-governance scale: Access - Distribution; Participation; Co-management; and Co-ownership. The different level of the scale, also defined as sub-dimensions, are aimed at measuring and providing the design principles to improve access to power and its distribution in governing of technological infrastructures and services, through the promotion of self-organization, self-governance[80], co-governance or polycentric governance[81] of urban communities.

The first elaboration of a scale to measure the level of citizen involvement in public decision-making processes was elaborated by Arnstein who designed the "ladder of citizen participation", a scale for civic participation, which includes eights incremental levels[82]. The difference between the levels explains the different power attributed to citizens within a specific process (in the cases analyzed by Arnstein, the different level of influence on public decisions exercised by citizens). The reasoning developed by Arnstein formed the basis for the construction of the Tech Justice variable in the model presented in this article, adding to the measuring feature a prescriptive value. An inspiration for this was the "democracy cube" described by Archon Fung with the goal of updating Arnstein's ladder of citizen participation. Fung introduced an analytical tool

[80] E. Ostrom, *Governing the Commons*, (1990).

[81] C. Ansell & A. Gash, *Collaborative governance in theory and practice*, 18 M 543–571(2007). V. Ostrom et al., *The organization of government in metropolitan areas: a theoretical inquiry* 55 Am. Pol. Sci. Rev. 831–842, (1961); E. Ostrom *Polycentric systems for coping with collective action and global environmental change* 20 Global Envtl. Change 550-557 (2010); M. Mc Ginnis & J. Walker, *Foundations of the Ostrom workshop: institutional analysis, polycentricity, and self-governance of the commons,* 143 Pub. Choice 293–301 (2010).

[82] S. Arnstein, *A Ladder of Citizen Participation,* 35 J. Am. Plan. Ass'n 216 (1969).

composed of institutional design choices (participants' selection, authority and power, communication mode) according to which varieties of participatory mechanisms (i.e. deliberate and negotiate; co-govern; direct authority) can be located[83]. The different sub-dimensions of the ladder provide in fact both an empirical value and a normative value, as they contain policy recommendation for achieving a satisfying level of Tech Justice in the city.

The variable of Tech Justice is also relevant because it allows to highlight the potentiality of digital infrastructures and access to technology as an enabling factor for local development and social cohesion[84]. The idea of net equality stresses the positive externalities of an open digital infrastructure, which might generate a virtuous cycle: openness generates innovation, which attracts interest from the users and other actors, leading to more investments in technological urban infrastructures and bringing benefits to vulnerable groups. This dimension also relies on the concept of Digital Sovereignty, meaning that users can freely decide which data can be gathered and distributed about themselves, and on the ownership of such data. In the next paragraph, the four incremental sub-dimension of Tech Justice will be explained.

### 3.1. Access and Distribution

Tech Justice's first sub-dimension is technological equality, based on access and distribution of tech and digital infrastructure. This first level is based on a concept of formal equality, or equal access. The assumption is that, in order for ordinary city inhabitants to cooperate across social and economic differences, they must each have equal access to the means of cooperation. The digital divide, in terms of access to broadband and digital devices, as well as the level of digitization of public services provided by municipalities, is an important factor in bringing together a diversity of people to self-organize for the realization of urban commons.

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[83] A. Fung, *Varieties of Participation in Complex Governance*, Public Administration Rev., 66-74. (2006)

[84] O. Sylvain, *Network equality*, 67 Hast. L. J. 103 (2016).

The Tech Justice factor can rely upon secondary data on cities extrapolated from different sources of information on transparency, the city smart governance, e-government etc. deriving from infrastructures of public institutions such as the European Union (Open Data Barometer, EU DESI Index) and the World Bank. As already stressed above in the article, the variable of Tech Justice is aimed at measuring the capacity of including minorities in the access to concrete opportunities related to technological development. Consequently, the variable can be measured also through the presence/absence of local public policies/programs aimed at overcoming (ethnic/cultural/ geographic/economic) digital divides; or assessing the presence/absence of specific local NGO projects focused on the overcoming of (ethnic/cultural/geographic/economic) digital divides.

**3.2. Participation**

Tech Justice can be assessed measuring the participation of the city inhabitants in projects/initiatives such as the one just described above. This can happen with the promotion of self-organization of urban communities around those projects/initiatives. The participation sub-dimensions can be measured through the mapping of experiences of urban policies that promotes participation of city inhabitants into the production/decision-making/management of digital infrastructures or services and even policies that promote urban communities' self-organization.

The sub-dimension of participation is particularly evident in the cases pertaining to open data and e-government. As illustrated above, platforms often focus on improving citizens' access to information and open data with the aim of including them in public decision-making processes through online public consultations and deliberations. As further discussed below, the experience of the *Decidim Barcelona* and *Decide Madrid* platforms are successful examples of the participation dimension, as well as widely diffused platforms for running the Participatory Budget process through online deliberation and vote, such as in the case of Paris or Milan.

### 3.3 Co-management

Co-management is the third dimension of Tech Justice and it is aimed at measuring the presence of defined roles and responsibilities for civic actors/communities envisaged by the project promoting the involvement of the city inhabitants into the direct management of digital infrastructure or services. This form of involvement may also imply the creation of job opportunities in the city. City inhabitants could in fact be involved in the management of infrastructures or services not just on a voluntary basis but also in a professional way. To avoid the risk of discrimination against disadvantaged communities, which might not have the skills to participate actively in the management of the infrastructure, a process of accompaniment is necessary. This would take place through an intense fieldwork consisting of both a learning phase and co-working facilitation. Such process would allow urban communities to be provided with skills to carry out some of the activities necessary for an infrastructure management.

This dimension emerges in cases of community-led projects that contribute to the management of certain services and infrastructures, as observed in some of the cases of the Wireless area (i.e. Coviolo in Reggio Emilia or the Co-Rome process) when urban communities take advantage of existing infrastructures to improve the services offered and thus improve the access to the Internet or manage neighborhood services based on technology.

### 3.4. Co-ownership

Lastly, co-ownership is the highest degree of intensity of the Tech Justice variable and it identifies whether, as result of full access to technology and the overcoming of the urban digital divide, the communities involved are able to collectively participate in and build their own cooperative platforms. The variable also investigates whether the skills and tools the community acquires are directly used in an entrepreneurial way. This would configure a system of 'civic digital enterprises' distributed in the city.

This last dimension emerges from the observation of some of the most relevant case studies, for instance in the field of wireless. Many of the design principles that the wireless community networks apply indeed mirror the design principles

of the urban commons. As stated in the Declaration of Community Connectivity[85], the design principles of the community network initiatives include: a) collective ownership (the network infrastructure is owned by the community where it is deployed); b) social management (the network infrastructure is governed and operated by the community); c) open design (the network implementation details are public and accessible to everyone); d) open participation (anyone is allowed to extend the network, as long as they abide the network principles and design); e) free peering and transit (community networks offer free peering agreements to every network offering reciprocity and allow their free peering partners free transit to destination networks with which they also have free peering agreements); and f) the consideration of security and privacy concerns[86] while designing and operating the network.

The case studies analyzed in this article seem to be particularly resistant to the dimension of co-ownership, despite this goal being often the object of a research program (as happened with regards to the pilot experimentations conducted by city governments in the case studies concerning data). The case studies in the wireless area, particularly the case studies of community mesh and broadband networks, often embody forms of co-ownership and promote what legal scholar Olivier Sylvain calls "broadband localism"[87]. They are also able to promote a form of Digital Sovereignty, as shown by those projects guided by urban authorities that enable citizens to produce, access and control their data and exchange contextualized information in real-time through institutional, platforms ensuring confidentiality accountability and scalability of the model.

[85] L. Belli, *Community connectivity: building the Internet from scratch*, Annual report of the UN IGF Dynamic Coalition on Community Connectivity (2016).
[86] In the debate around the Internet of Things from a right-based perspective, the issue of privacy and data ownership is crucial. See B. D. Weinberg, George R. Milne, Yana G. Andonova & F. M. Hajjat, *Internet of things: Convenience vs. privacy and secrecy*, 58 Bus. Horizons, 615-624 (2015).
[87] O. Sylvain, *Broadband Localism,* 73 Ohio St. L. J. 795 (2012).

## 4. Case studies

This paragraph introduces a taxonomy of tech justice case studies based on three types of urban infrastructures: mobility; energy; digital networks. Those types of infrastructures embody the challenges described in the paragraphs above related to human rights concerns in the governance of technologies in cities. These case studies also show clearly the features described by the dimensions of tech justice as an institutional design principle to design urban laws for a just and democratic smart city.

### 4.1. Urban Mobility

Urban transportation is one of the most profitable terrains for the expected success of technological and digital developments, but it also holds the potential to host many controversial challenges in different areas. The IoX will likely arrive in urban transportation and produce a disruptive impact. Recently a network of data companies including Qualcomm, automotive companies and the University, have launched a testing project for applying the IoX to urban transportation: "Connected Vehicle to Everything of Tomorrow (ConVeX)" is a consortium for carrying out the first announced Cellular-V2X (C-V2X) trial based upon the 3rd Generation Partnership Project's (3GPP) Release 14, which includes Vehicle-to-Everything (V2X) communication. The trial efforts are expected to focus on Vehicle-to-Vehicle (V2V), Vehicle-to-Infrastructure (V2I) and Vehicle-to-Pedestrian (V2P) direct communication, as well as Vehicle-to-Network (V2N) wide area communications[88]. The phenomena of the sharing economy, in particular the gig economy platforms of Uber and Lyft, have already shown the effects and challenges it produces at the urban governance scale. Sharing/gig economy platforms are an area where the risks and challenges of tech penetration are more evident. In countries like France[89] or Belgium, the sharing economy platforms like Uber have triggered protests of taxi drivers and fueled reactions by regulatory agencies and courts of law. The same could happen for other

[88] Qualcomm Technologies Inc. (2017), *Press release,* [online]. Available at https://goo.gl/NfBuFg. [Accessed: 18 December 2017].

[89] A. J. Rubin & M. Scott, *Clashes Erupt Across France as Taxi Drivers Protest Uber*, June 25th 2015 www.nytimes.com/2015/06/26/business/international/uber-protests-france.html.

categories of platforms, in particular for initiative of workers whose job will be disrupted by technological advancements if regulatory and/or policy action are not taken. The other pressing issue is the risk of discrimination that occur in the sharing economy platforms that we discussed in the first part of the article. However, they might be take different shapes, such as discrimination based on cultural identity, ethnicity, religion, political opinions, gender discrimination, economic discrimination.

Besides the examples of the sharing economy and gig economy platforms, we can also observe the blossoming of not-for-profit platforms, where users exchange goods or services for several purposes other than profit, mainly saving resources and money, or improve their social networks and their socialization and skills learning opportunities. In the field of urban transportation, this is the case of the car-pooling platforms. There are several cases of car-pooling platforms initiated by communities and NGOs (in Italy, the platform *Bla Bla Car* is a widely diffused not-for-profit carpooling platform) and of public policies aimed at providing incentives to carpooling for commuters. Some policies were implemented in the US long before the current wave of sharing economy first appeared. One example is the regulation introduced during the Second World War by the Federal Government of the US to manage peoples' behaviors and facilitate the sharing of cars in order to save energy and metal, thus supporting the State's war efforts. In a first phase, between 1942 and 1945, the government promoted car-pooling to support the war effort. The system began to work through "car sharing clubs", or "car clubs". A government regulation called for workers to organize themselves to travel to the workplace through car-pooling if public transport was not available and a program was created, the "Car Sharing Club Exchange and Self-Dispatching System" which functioned as a carpooling platform, but without technological help[90]. It was distributed in the form of a bulletin in the bigger workplaces that crossed demand and supply of the workers' commute. Companies and factories, as workplaces, were required to provide the service (the bulletin)

[90] N.D. Chan & S. A. Shaheen. *Ridesharing in North America: Past, Present, and Future,* 32:1 Transport Reviews 93-112 (2012).

and to encourage the creation of Car Sharing Clubs. Sharing plans rest primarily on the premise of citizens' collaboration with the authorities. Adherence to these plans must be collaborative and cannot be mandatory. As noted by Bulman[91], public opinion had accepted the approval of these plans and any resistance was due only to fear of relapses in terms of civil liability in the event of a traffic accident. There are other regulatory attempts of providing carpooling incentives, such as the CarPool Incentives programs addressing commuters implemented by the US agency for Environmental protection in 2004. There are also attempts of urban authorities to provide citizens with smart transportation services that provides a collaborative model of governance that do not foresee yet technology in the policy strategies but will do so in the near future, and on which it would be important to focus attention in order to accompany the transition and not incur into the controversial integration of technology. The City of Barcelona has implemented the superblock (*Superilles*), introduced in 2006 by Mayor Jordi Hereu i Boher, with a first pilot in Gràcia neighborhood. It is an innovative example of reform of the urban transportation system that is aimed at facilitating city inhabitants' socialization and community building, although it does not foresee, at the current stage of advancement, a role for a digital platform. The block however does appear to be a promising step in empowering them and thus achieving the final goal set by the policy. The Superblock was described as being a new model of mobility that changes the traditional structure of the urban road network[92]. The superblock's goal is to restrict traffic to a select few of the larger roads, in order to design car free areas that maximize public space and turn urban streets into community spaces[93]. Cars are forced to ride around the car free grid. The goal is to create a pedestrian civic grid constituted by twelve blocks by 2018[94]. With

[91] J.S. Bulman, *Car sharing plans,* 31:2 Georgetown L.J. 185-200 (1943).
[92] See https://ajuntament.barcelona.cat/superilles/en.
[93] M. Bausells, *Superblocks to the rescue: Barcelona's plan to give streets back to residents*, 17 May 2016, in www.theguardian.com/cities/2016/may/17/superblocks-rescue-barcelona-spain-plan-give-streets-back-residents.
[94] BBC, *Superblocks: Barcelona's war on cars*, 8 February 2017 https://www.bbc.com/news/av/magazine-38895435/superblocks-barcelona-s-war-on-cars.

its implementation, the superblocks provide solutions to the main problems of urban mobility and improve both the availability and quality of public space for pedestrian traffic. Through modifications to the basic road network, restricting the access to cars and the establishment of differentiated routes for each transportation vector, the urban public mobility system will be re-organized. The superblocks are bigger than any actual block and yet smaller than a neighborhood. They create a new ecosystem inside the public spaces making them quieter, more walkable and greener. This in itself enhances social interactions and improves coexistence. The superblock produced some negative impact, mainly on traffic and length of car-based travel, but protests evaporated. Each superblock is designed and implemented through a participative process. Different entities and citizens are involved through workshops and consultations with the aim of understanding their needs and defining specific actions. In addition, each neighborhood has a team where both entities and public administration are represented in order to lead the process[95].

A typology of the sharing economy can be drawn from the wide variety of empirical manifestations of the digital economy that have been applied to urban transformation. The European Union has made an effort to understand the local dimensions of the sharing economy and it has proposed a comprehensive analytical framework (European Committee of the Regions 2015). The protests against Uber by taxi drivers that we recalled in the first part of the paper have occurred also in Spain. In Spain, where there was a situation similar to the Italian one with the taxi company that lodged an appeal against Uber, the Juzgado Mercantil nº 3 of Barcelona chose to refer to the European Court of Justice with a reference for a preliminary judicial review. The object of the appeal was the determination of the legal nature of the activity provided by Uber. In fact, the Spanish judge asked the European court whether the services provided by Uber could be classified as electronic mediation services or information society services within the meaning of Article 1 (2) of Directive

[95] F. O'Sullivan, *Barcelona's Car-Taming 'Superblocks' Meet Resistance,* 20 January 2017, https://www.citylab.com/transportation/2017/01/barcelonas-car-taming-superblocks-meet-resistance/513911/.

98/34 / EC2 of the European Parliament and of the Council of 22 June 1998 providing for an information procedure in the field of technical standards and regulations and rules relating to information society services (European Court of Justice 2015). The Court decided to receive the thesis of the General Attorney of Court of Justice, and classified Uber as a transportation service. The Court stated in fact that "an intermediary service, such as the one object of the case, concerning the intermediation through an application for smartphones and the remuneration of non-professional drivers own vehicle with people wishing to make a move in the urban area, must be considered inextricably linked to a transport service and therefore falling within the qualification of 'service in the transport sector', under the law of the union. this must therefore be excluded from the scope of the freedom to provide services in general and the directive on services in the internal market and the directive on electronic commerce".

If a platform such as Uber is to be classified as a transportation service, considering the impact of the platform on the existing mode of transportation in the city, it could be considered proper to include it within an integrated model of urban mobility, in itself an object of city regulation. The most challenging issue form a regulatory perspective seems to be the building of a governance model for integrated urban mobility that includes public operators, private operators, so line transportation and not-line transport (including taxi, limo companies) and sharing/collaboration/pooling-based private transport as an additional dimension of the not-line private transportation. In the EU there has been a recent blossoming of experimentation of the model of Maas, mobility as a service based on the creation of unique line of transportation services. The idea is to integrate public and private systems of transportation into a single digital service. , The leading example of this is that of Finland, the city of Helsinki in particular[96]. This model would enable collaboration between different actors of the existing mobility system (the City, private companies, private transportations individual and collective, taxi drivers) and would

[96] A. Hietanen & S. Sahala, *Mobility as a Service. Can it be even better than owning a car?,* inwww.itscanada.ca/files/MaaS%20Canada%20by%20Sampo%20Hietanen%20and%20Sami%20Sahala.pdf.

facilitate the integration of technological infrastructures and services. The City would act as an enabler of the creation of digital platforms of experimentation consisting in partnership for the building of community-based system of Mobility as a Service (community-based MaaS). The governance of the platform would involve users, private developers, workers of the platform and the City itself. It would then require implementing the second level of participation, and involving the different categories of participants in the governance structure with deliberation and participatory tools that could require different degrees of involvement: consultation, decision, advise. The governance structure would guarantee anti-discrimination procedures, thus realizing the level of Tech Justice regarding access and distribution. However, the realization of Tech Justice would not be realized solely through a top-down approach, which would be ensured also through the realization of a workers-to-users of the platform intermediation. The interest of users and workers of the platform would be organized from the ground up in forms, procedures or institutions that will guarantee them rights of collective organization consisting in forms of "urban transportation pools".

**4.2. Urban Energy**

Similarly to what is happening in the field of urban transportation, we can also observe emerging locally networked energy production within a community through the establishment of "micro-grids" to become more energy self-sufficient and resilient[97]. Energy services in the city are deeply affected by the diffusion of the IoT and IoX. The collaborative production, management, distribution and ownership of urban energy is a key challenge to be addressed for a city that implement a right to the tech approach.

This issue is subject of a series of policy experimentation in EU cities.

The City labs from the Horizon2020 Smarter Together project, in particular the lighthouse cities Lyon, Munich and

[97] J. Duda et al., *Building Community capacity for energy democracy: a deck of strategies, Democracy Collaborative,* http://prototypes.democracycollaborative.org/energydemocracy/fullscreen.html. (last visited 16 March 2018).

Vienna, are concrete experimentation of large-scale smart city solutions in demonstrative neighborhoods of tech-based tool for climate adaptation, environmental sustainability and energy self-production in social and private housing complexes and public facilities, electric mobility. The experimentations will focus on finding the right balance between ICT technologies, citizen engagement and institutional governance to deliver smart and inclusive solutions. The services and housing and public facilities refurbishments are prototyped through co-creation processes. The city of Barcelona is investing huge efforts in enforcement of the right autonomous local energy production and commons-based governance of urban assets and infrastructures[98].

Few other examples can be mentioned that are supported by the EU through urban programs (Urbact and Urban Innovative Actions). The City of *Viladecans* implemented an innovative approach with the support of the EU through the Urban Innovative Action program, part of the Regional Development Fund, the UIA Vilawatt project (Viladecans 2017). It foresees the implementation of a public-private-citizen partnership for energy governance, starting with an experimentation in the *Montserratina* District. The Energy Transition will be initiated by the creation of an Innovative Public-Private-Citizen Governance Partnership at Local level (PPCP) that will manage the new local tools for the transition: energy supply, energy currency, energy savings services, deep energy renovation investments and renewable energy production. This entity will have the Municipality together with the local businesses and the citizens of *Viladecans* as its members and it will create a Local Energy Operator that will be the local energy supplier and the renewable energy producer, and an Energy Savings Company, offering energy savings services and energy renovation investment to all the members[99]. The city of Gothenborg created a district level energy system, integrating electric power, heating and cooling. The project, named FED

[98] U. Mattei & A. Quarta, *Right to the City or Urban Commoning: Thoughts on the Generative Transformation of Property Law*, 1 Italian L. J. 303, 326 (2015).

[99] Urban Innovative Actions. (2017), *Gothenburg FED project,* [online]. Available at https://uia-initiative.eu/en/uia-cities/gothenburg [Accessed: 18 January 2020].

Fossil Free Energy District[100] use technologies such as heat-pumps and wind into larger system to reduce peak loads and the use of fossil fuels.

It was already explained[101] how this model could be realized through the inspiration of the Non-Profit Utility (NPU) model. In *Melpignano*[102], in the province of Lecce (Region Puglia, Italy), a community cooperative was constituted by a group of residents for the production of energy from renewable sources in partnership with the City. These residents contribute to the project by providing their houses for the installation of solar panels and they receive in exchange the produced energy at zero cost. The profits generated by the sale of surplus energy are reinvested in infrastructures and services for the local community. Further steps could be implemented now that the European Commission recognized the role of *citizens' energetic communities*[103] as efficient and economically sustainable platforms to respond to citizens' needs in terms of energetic provisions, services and local participation. Moreover, it is able to ensure access to the energetic market to categories of people that would not otherwise have access to it.

### 4.3. Urban Digital Networks

Finally, an area where we can observe a dramatic increase of tech justice case studies are urban policies and practices aimed at improving citizens involvement and powers in the governance of digital infrastructures, networks and services.

A first typology is represented by the City of Barcelona, which is implementing the right to the city approach applied to the digital sphere through policies promoted by its innovation office in order to achieve a "digital or technological

[100] Urban Innovative Actions. (2017), *Viladecans Vilawatt project,* [online]. Available at https://www.uia-initiative.eu/en/uia-cities/viladecans [Accessed: 18 January 2020].

[101] C. Iaione, *Governing the urban commons*, 7 Italian J. Pub. L. 1 171, 221 (2015).

[102]Melpignano Community Cooperative, http://www.coopcomunitamelpignano.it/ (last visited 1 November 2018).

[103] Directive (Eu) 2019/944 Of The European Parliament and Of The Council of 5 June 2019 on common rules for the internal market for electricity and amending Directive 2012/27/EU (recast).

sovereignty"[104]. This approach is aimed at tackling the key issue of data ownership and puts the digital rights of citizens at the center of the discussions on citizens' data use.

A different approach towards tech justice in the city digital governance is represented by cities investing on the co-management and co-ownership of broadband infrastructure. The most exemplary case is represented by the "Coviolo Wireless" project in Reggio Emilia which received also an important recognition by the European commission through the European Broadband Awards 2017[105]. A group of city inhabitants organized in the Neighbourhood Social Center of Coviolo, in collaboration with the City of Reggio Emilia and Lepida (the regional digital infrastructure operator), blending public and community funding, built the infrastructure and currently manages bearing all the management costs. Coviolo inhabitants have now access to high speed internet at an affordable cost and the capacity of the network can be expanded up to 1 Gbps without any structural intervention. This solution was developed through a participatory bottom up program called Neighborhood as Commons and through the same program it is now being expanded to other neighborhoods[106].

Urban digital networks whose governance is inspired by design principles adherent to the urban commons framework are also emerging from community-based practices. Examples are represented by cooperatively-owned platforms that adopt mechanisms similar to those of sharing economy but are owned by a community cooperative that ensure the transparency and democratic nature of the data governance and redistribute or reinvest its profits in the community itself. Trebor Scholtz argued that a model of platform cooperativism is emerging from the

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[104] R. Espelt & M. Garriga, *Digital platforms and democracy*, in F. Badia Dalmases, A. Rubi & M. Balestrini (eds.), *The ecosystem of an open democracy* (2017). See also I. Calzada, *(Smart) Citizens from Data Providers to Decision-Makers? The Case Study of Barcelona,* 10 Sustainability 9, 3252, (2018).

[105] See *Good broadband practice: Coviolo Wireless, Italy*, https://ec.europa.eu/digital-single-market/en/news/good-broadband-practice-coviolo-wireless-italy.

[106] See Comune di Reggio Emilia, *Il quartiere bene comune*, https://www.comune.re.it/retecivica/urp/pes.nsf/web/Dcntrmnt1?opendocument.

ground, with cooperatively owned and democratically governed digital platforms which might constitute an alternative to the model of value creation embraced by the dominant sharing economy corporations[107]. Building on this approach, the commons approach would require the formation of civic unions that would represent a network of organization in order to coordinate their activities. This type of platform is particularly interesting when implemented at the neighborhood or district level. Interesting examples are available in the area of culture, heritage and sustainable tourism. In Italy, the cooperatively-owned platform "FairBnb"[108]. In France, the platform *Les oiseaux de Passage*, a French-based cooperatively-owned platform for sustainable tourism and hospitality carried out by residents themselves[109].

## 5. Concluding remarks

The results of the analysis developed in this article allow to identify few cardinal dimensions of a legal infrastructure which can support the construction of an urban law microsystem dedicated to the governance and management of urban services and assets. Such legal microsystem shall build on new polycentric

[107] T. Scholtz, *Platform Cooperativism. Challenging the Corporate Sharing Economy*, Report of the Rosa Luxemburg Foundation, in http://www.rosalux-nyc.org/platform-cooperativism-2/, (January 2016) (last visited 30 October 2018).

[108] FairBnB offers bedrooms for short-term visits. Half of the commission charged by the platform is retained by Fairbnb.coop and used to fund local community projects. See https://fairbnb.coop/it/.

[109] The legal entity owning the platform is a Cooperative Society of Collective Interest. Its founding members are three: French cooperatives, Hôtel du Nord, Ekitour and Point Carré, the Minga network and 5 physical persons. The work that the cooperative Hotel Du Nord conducted in the previous years in the city of Marseille implementing the principles of the Council of Europe Faro Convention on the Value of Cultural Heritage for Society (Far o2005) is the main inspiration for the platform. The Hotel du Nord is indeed a Faro Heritage Community. It proposes a network of hosts, mainly residents, offering visitors bedrooms and heritage walks to discover the natural and cultural heritage of the northern area of Marseille. See http://blog.lesoiseauxdepassage.coop/it_it/. See also M. E. Santagati, *Heritage communities within the Faro Convention framework: the case of "Hotel du Nord"*, February 27, 2017, https://labgov.city/theurbanmedialab/heritage-communities-within-the-faro-convention-framework-the-case-of-hotel-du-nord/.

modes of management and ownership of urban technological infrastructures and networks.

The first dimension is a policy dimension. The policy dimension has a twofold profile. The first profile is rooted in an international policy framework. The 2030 Agenda for sustainable development[110] envisions as a sustainable development goal "end poverty in all its form everywhere", operationalized, inter alia, through the sub-goal "ensure that all men and women, in particular the poor and the vulnerable, have equal rights to economic resources, as well as access to basic services, ownership and control over land and other forms of property, inheritance, natural resources, appropriate new technology and financial services, including microfinance"[111]. The link between technology and justice emerge clearly from the 2030 Agenda, for instance in goal 5, "achieve gender equality and empower all women and girls" that at sub-goal 5.b build a connection between technology and gender equality "enhance the use of enabling technology, in particular information and communications technology, to promote the empowerment of women"[112] as well as access to clean energy as stated in goal 7 "ensure access to affordable, reliable, sustainable and modern energy for all"[113]. The second profile is rooted in the duty of the European Union to ensure a universal access to technology, ensured through multiple policies[114] and reinforced by recent initiatives recognizing the citizens' role in providing fair access to technology and its connected benefits. An example of this approach (mentioned earlier in the article) is the recognition by the European Commission of the role of *citizens' energy communities*[115] as

[110] S. C. Valencia, D. Simon, S. Croese, J. Nordqvist, M. Oloko, T. Sharma, N. T. Buck & I. *Versace, Adapting the Sustainable Development Goals and the New Urban Agenda to the city level: Initial reflections from a comparative research project,* 11 Int'l J. Urb. Sustainable dev. 4, 4-23 (2019).

[111] *Transforming Our World: the 2030 Agenda for Sustainable Development,* sustainabledevelopment.un.org A/RES/70/1, goal 1.

[112] *Ibidem.*

[113] *Transforming Our World: the 2030 Agenda for Sustainable Development,* sustainabledevelopment.un.org A/RES/70/1, goal 7.

[114] https://ec.europa.eu/digital-single-market/en/broadband-strategy-policy.

[115] Directive (Eu) 2019/944 Of The European Parliament and of the Council of 5 June 2019 on common rules for the internal market for electricity and amending Directive 2012/27/EU (recast).

efficient and economically sustainable platforms to respond to citizens' needs in terms of energy provisions, services and local participation.

The second dimension is an institutional dimension. The model of co-governance described in this article foresees a leading role of the public actor by reinterpreting its role no as a mere partner of private actors but rather as an enabling platform of different actors through economic or technical support as well as capacity building and reskilling or upskilling processes on social, economic, technological innovations. The relationship between technologies and regulations in the framework of co-governing approaches needs to be integrated. To accompany the implementation of a co-governance approach, innovation brokerage and advisory hubs should be structured as multidisciplinary missions-oriented units that work alongside local public administrations, local communities, the local private, knowledge and social sector, and tech companies to adapt these new formulas to local ecosystems of innovation and experiment them after defining terms and working methods useful to govern these experiments in a way that generates social and local added value.

The third is a legal dimension. To support public action in the context of collaborative dynamics with new types of private actors (including investors not interested in mere speculation but committed to a vision of sustainable and inclusive economic development) and social (including universities, civil society organizations, the inhabitants themselves), it is necessary to develop, test and implement innovative partnerships models centered on public-private-community cooperation that strengthens the role of general interest and make it the object of forms of experimental projects for sustainable innovation. The "tech justice" approach demonstrates how these development, testing and implementation of complex levels of co-governance in the tech sector can take place. It requires the co-planning as much as co-definition and co-implementation of partnerships for deployment social and technological or digital innovations. Such should be engineered first as public-community partnerships and then as public-private-community partnerships. Although some of the experiments analyzed in this article go in this direction, they are still in an embryonic state and have yet to demonstrate

the ability to activate and support real, sustainable and lasting forms of tech infrastructure governance capable of producing social, economic, environmental, urban, cultural impact.

The fourth dimension is financial. Co-governance arrangements impose the need to consequently involve patient or long-term investors (e.g. pension funds) to strengthen existing infrastructures and go beyond the real estate fund system through a model that guarantees the profitability of the investments, but also the social and environmental sustainability thus minimizing risks normally related to this type of projects. The 2018 Boosting Investment in Social Infrastructure Report prepared by a High-Level Task Force (HLTF) chaired by Romano Prodi and Christian Sautter, in collaboration with DG ECFIN and the European Long-Term Investors Association (ELTI)[116] estimated at around 57 billion the financial gap in Europe for social infrastructure in euros per year. The report also pointed out that the investment in social infrastructure has decreased by 20% since 2009.

The fifth dimension is the design and urban dimension. From the first point of view, the city should promote urban planning formulas that allow hybridization between different actors and different use of technology and that increase the sustainability of several urban policy silos (i.e. transportation; housing) by carrying out mixed profit and non-profit activities in common areas and in relation to common services. The final aim should be to trigger, through urban planning tools a robust, homogeneous and universalistic spread of a pool of innovative tech solutions, above all from the point of view of the implementation, financing and management model. An accurate monitoring and evaluation system should test the effectiveness of these strategies.

Finally, the technological dimension itself which requires the need to invest in innovation and sustainability as urban and architectural design principles, but above all as a work base to transform urban public spaces or buildings into urban living labs to generate institutional, economic, technological, digital, energy

[116] L. Fransen, G. del Bufalo & E. Reviglio, *Boosting Investment in Social Infrastructure in Europe*. Report of the HLTF Force on Investing in Social Infrastructure in Europe, Discussion Paper, 074, January 2018.

innovations. This implies the need to contemplate spaces to generate and incubate these innovations, as well as guarantee the brokerage function between inhabitants, users, local innovation players aimed at creating public-community and public-private-community partnerships for sustainability[117]. This would also allow investing in the reskilling of many vulnerable city residents as well as activating incubation processes for community enterprises and cooperatives. This mechanism would allow a broader access to the opportunities offered by technological modernization of buildings (e.g. home automation, the internet of things, distributed production of energy and other technological services, etc.) and infrastructure (transport, heating, broadband, etc.).

In the end many problems remain unsolved in terms of how to design and implement the necessary innovations in urban policies and laws to face the social, economic and climate crisis factors that will put an increasing pressure on cities in the 21st century[118]. A chapter of urban law dedicated to networks and infrastructure should be based on this injection of innovation and sustainability and on the recognition of the right of community of users to manage services of general interest as well as services of general economic interest. These public-private-community partnerships at least bear the promise to spread the response to the challenges that digital transition on one hand and climate change on the other pose to cities, its inhabitants and in particular the most vulnerable groups of urban populations[119].

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117 J. Evans, A. Karvonen & B. Raven, *The Experimental City* (2016); K. Steen & E. van Bueren, *The Definining Characteristics of Urban Living Labs*, 7 Technology Innovation Management Rev. 21-33 (2017); M. Keith & N. Headlam, *Comparative International Urban and Living Labs*, Urb. Transformation (2017).

118 C.F. Sabel & J. Zeitlin, *Experimentalist Governance*, in D. Levi-Faur (eds.), *The Oxford Handbook of Governance* (2012), at 1-8.

119 C. Iaione, E. De Nictolis & A. Berti Suman, *The Internet of Humans (IoH): Human Rights and Co-Governance to Achieve Tech Justice in the City*, 13 L. and Ethics of Human Rights 2 263, 299 (2019); N. Davidson, *Affordable Housing Law and Policy in an Era of Big Data*, Fordham Urb. L. J. (2017).