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PEER REVIEWED

# A critical approach to platform real estate in the urban ecosystem

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## KEYWORDS

*Platform Real Estate, Urban ecosystem, Contemporary urban capital, Platform urbanism, new technology-driven re-development practices*

## ABSTRACT

The paper addresses some of the new challenges and urban issues through a critical theoretical approach. Following the framework of human ecology, and its subsets, the digital transformation on the real estate market is analyzed, focusing on the role of proptechs in correlation with urban ecosystem and capital. In particular, the paper focuses on digital transformation in real estate industry, contemporary urban capital and new technology-driven re-development practices. Therefore, changes in urban public space and the relation with the private one are addressed, emphasizing how the typical ecosystemic mechanisms act.

The paper uses primary and secondary sources. Its aim is to investigate the balance net of the implementation of digital technologies in the ecosystemic equation.

## Introduction

The paper analyzes at first the challenges of new urbanism under a critical theoretical perspective, in the framework of human ecology. Thus, it focuses on the conceptual analysis of the term ‘property technologies’ (proptechs). Therefore, the article addresses the digital transformation on the real estate industry, with a focus on the role of specific platforms in terms of funding. However, a differentiation between digitization, digitalization and digital transformation is not operated.

The second part of the article starts with the theoretical analysis of urban ecosystem and public space in relation with the process of capital extraction<sup>1</sup>. Then two predominant perspectives on technology and urban ecosystem are analyzed.

Finally, the discussion concludes with the exposition of the internal logics of platform urbanism and the identification of players, trends and practices of the global real estate industry in the last years.

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## Digital transformation in the real estate industry

The individual and collective experience into the digital world has been described in relation to the production-consumption binomial.<sup>2</sup> This is described by the research group Ippolita<sup>3</sup> in terms of a sacrificial ritual in which a body-mind-data part of the ‘prosumer’ (producer-consumer of digital contents) is offered to the machines in order to elaborate them and to give back a ‘revealed truth’, while the other is given back to humans and consumed in the libation in which the same users participate.<sup>4</sup> According to Zuboff, a new economic order emerged. This looks at “human experience as free raw material for hidden commercial practices of extraction, prediction,

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<sup>1</sup> David Harvey, *The Enigma of Capital and the Crises of Capitalism* (New York: Oxford University Press, 2010).

<sup>2</sup> Ippolita, *Anime elettriche: Riti e miti social* (Milano: Jaca Book, 2016), 61-62, [https://books.google.it/books/about/Anime\\_elettriche.html?id=-RR2jwEACAAJ&redir\\_esc=y](https://books.google.it/books/about/Anime_elettriche.html?id=-RR2jwEACAAJ&redir_esc=y).

<sup>3</sup> Ibid.

<sup>4</sup> Ibid.

and sales”.<sup>5</sup> Indeed, as stated by the author<sup>6</sup>, the sustaining element of this economic logic is the behavioral surplus resulting from the processing and collection of personal data, which is fed to “advanced manufacturing processes known as ‘machine intelligence,’ and fabricated into prediction products that anticipate what you will do now, soon, and later”.<sup>7</sup>

Data-driven companies exploit data to create predictions and to make considerable profits, as clearly stated by Nissenbaum: “Personal data is the ‘gold’ of a new category of companies”.<sup>8</sup> In the internet entrepreneurs’ culture: “the amount of money to be made, and the speed at which the money is made, are the supreme values... Money-making becomes the benchmark for success...”.<sup>9</sup> But data must be mined in order to extract useful information even from the urban environment. Indeed, as stated by Mezzadra and Neilson: “The productive front of data mining is particularly amplified in urban environments, which have been reshaped in many parts of the world by the stretching of work beyond traditional points of production. The urban landscape has become a site for new processes of data extraction that function through various ‘smart city’ and remote-sensing technologies”.<sup>10</sup> So, the focus is not merely on the speed at which data are collected, but also on the amount of data collected. Thus, according to Braesemann and Baum: “more data actually make models perform better, which usually attracts more users, and thus more data”.<sup>11</sup>

According to Mazzucato, “capitalism has always excelled at creating new desires and cravings. But with big data and algorithms, tech companies have both accelerated and inverted this process. Rather than just creating new goods and services in anticipation of what people might want, they already know what we will want, and are selling our

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5 Shoshana Zuboff, *The age of surveillance capitalism: The fight for a human future at the new frontier of power* (New York: Profile Books, 2019), 9.

6 Ibid.

7 Ibid., 21.

8 Helen Nissenbaum, “Privacy as Contextual Integrity,” *Washington Law Review* 79, no. 1 (2004): 103.

9 Manuel Castells, *The Internet Galaxy: Reflections on the Internet, Business, and Society* (New York: Oxford University Press, 2001), 57.

10 Sandro Mezzadra and Brett Neilson, *The Politics of Operations* (Durham-London: Duke University Press, 2019), 145-146.

11 Fabian Braesemann and Andrew Baum, *PropTech: Turning real estate into a data-driven market?* (Oxford: Said Business School, 2020), 4-5.

future selves”.<sup>12</sup> Following this logic, exploitation of data permits to accurately predict what we desire. Therefore, their implementation into the decisional process provides companies and public administrations with a considerable competitive advantage. As such, the data sector acts as a central attraction for other fields, such as real estate. Indeed, digital data create value for all players involved in the sector, at every step of the pipeline.<sup>13</sup> As stated by Graham: “we live in cities where we navigate landscapes of not just bricks and mortar, but also data and algorithms”.<sup>14</sup> Thus, a wider understanding of the effects of technology adoption into our life is needed. According to Baum, internet and mobile telephony have changed all aspects of our lives: education, health, jobs, leisure, finance, romance and homes.<sup>15</sup> The Real Estate Sector (RES) as well, has been strongly influenced by technologies, while historically being recognized as a conservative sector, characterized by gradual evolutions.<sup>16</sup>

In recent years, the implementation of technology in the RES has caused disruptive transformations leading to the birth of a neologism: ‘proptech’. The term derives from the crisis of ‘property’ and ‘technology’, but it does not yet have a clear and universally shared definition. Baum and Dearsley describe it as a part of a wider process of digital transformation of the property industry made possible by the fourth industrial revolution, as “a movement driving a mentality change within the real estate industry and its consumers regarding technology-driven innovation in data assembly, transactions, and the design of buildings and cities”.<sup>17</sup>

Proptechs create connections among different industries, Baum and his colleagues summarizes them in the report *PropTech 2020: The future*

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12 Mariana Mazzucato, “Preventing digital feudalism,” *Project Syndicate*, October 2, 2019, [https://www.project-syndicate.org/commentary/platform-economy-digital-feudalism-by-mariana-mazzucato-2019-10?a\\_la=english&a\\_d=5d9465098e70173938ebab34&a\\_m=&a\\_a=click&a\\_s=&a\\_p=homepage&a\\_li=platform-economy-digital-feudalism-by-mariana-mazzucato-2019-10&a\\_pa=spotlight&a\\_ps=](https://www.project-syndicate.org/commentary/platform-economy-digital-feudalism-by-mariana-mazzucato-2019-10?a_la=english&a_d=5d9465098e70173938ebab34&a_m=&a_a=click&a_s=&a_p=homepage&a_li=platform-economy-digital-feudalism-by-mariana-mazzucato-2019-10&a_pa=spotlight&a_ps=)

13 Braesemann and Baum, *PropTech: Turning real estate*, 2.

14 Mark Graham, “Regulate, Replicate, and Resist – the Conjunctural Geographies of Platform Urbanism,” *Urban Geography* 23 (2020): 1.

15 Andrew Baum, *PropTech 3 - The future of real estate* (Oxford: Saïd Business School, 2017), 5.

16 Marc Feth and Holger Gruneberg, *Proptech - The Real Estate Industry in Transition* (January 10, 2018), 1.

17 Baum et al., *PropTech 2020: The future of real estate* (Oxford: Saïd Business School, 2020), 5.

of real estate.<sup>18</sup> At the same time, Bellintani et al. define proptechs as the whole of solutions, technologies, and tools for the innovation of processes, products, services and market in real estate industry.<sup>19</sup>

However, a more critical understanding is gaining ground. This is emphasizing the role of digital platforms and radically changing the way we work, socialize, and create value in the economy or compete for the resulting profits.<sup>20</sup> Thus, Shaw refers to proptechs as “platforms”, i.e. “something connecting users, and pulling things together into new aggregations and somehow relating to value”.<sup>21</sup> Indeed, as stated by Fields and Rogers: “the term ‘platform real estate’ better encapsulates the connective capacities and paths of action related to ownership, use, and exchange of land and buildings afforded by the digital advances”.<sup>22</sup> Moreover, the authors assert that data technology was already known in the real estate industry, but its innovative scope has increased significantly during the last decade<sup>23</sup>. Furthermore, Srnicek associates new technologies, organizational forms, modes of exploitation, types of jobs, and markets, to the creation of a new way of accumulating capital, which is “platform capitalism”.<sup>24</sup> But even, platforms can be source of inequalities, racism and exclusion, as explained by McElroy.<sup>25</sup>

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In accordance with these basic assumptions, it is possible to revisit “proptech” as “Platform Real Estate” (PRE), as suggested by Shaw.<sup>26</sup> This approach is useful to understand the digital innovation of the real estate industry avoiding technological essentialism, expanding the analogy of platform and providing a more accurate assessment of the inner logic of digital real estate technology.<sup>27</sup>

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18 Ibid., 7.

19 Bellintani et al., *PropTech Monitor. Tecnologie, strumenti e servizi innovativi per il Real Estate* (Milano: Politecnico di Milano, 2018), 7.

20 Martin Kenney and John Zysman, “The Rise of the Platform Economy,” *Issues in Science and Technology* 32, no. 3 (Spring 2016). <https://issues.org/the-rise-of-the-platform-economy>.

21 Joe Shaw, “Platform Real Estate: theory and practice of new urban real estate markets,” *Urban Geography* (2018): 10.

22 Desiree Fields and Dallas Rogers, “Towards a Critical Housing Studies Research Agenda on Platform Real Estate,” *Housing, Theory and Society* (2019): 4.

23 Ibid.

24 Nick Srnicek, *Platform Capitalism* (Cambridge: Polity Press, 2016), 40.

25 Erin McElroy, “Property as technology,” *City* (2020): 1-18.

26 Shaw, “Platform Real Estate,” 10.

27 Ibid.

Although the PRE sector is considered “a temporary fad” by many in the real estate market, the sector hit record investments in recent years.<sup>28</sup> Indeed, business trends in the RES suggest future implications for the industry. The report shows that, in recent years, an exponential increase in funding in the Proptech sector has occurred.<sup>29</sup> Indeed, according to data published by Venture Scanner in March 2018, the Proptech market has globally accelerated rapidly in terms of funding obtained, between 2011 and 2017 with a compound annual growth rate of 63%.<sup>30</sup> In this scenario, updated data for the second quarter of 2019 shows a significant increase in funding. Expectations for the second half of 2019 have even been exceeded, with funding reaching close to \$30 billion, virtually doubling the results of Q4 2018. The quarterly update for the Q1 2020 shows, however, a considerable decrease, which resulted in a 49% drop compared to the same period of time in 2019.<sup>31</sup> Furthermore, Bellintani et al. suggest a general trend for investors to increase funding in the sector, while funding tend to concentrate into a smaller selected number of PREs.<sup>32</sup> The trend is confirmed by the scenario elaborated by Baum et al. describing, among others, the number of proptechs founded between 1998 and 2018.<sup>33</sup>

It would be necessary to contextualize these results, which are not very encouraging for the market, with the disruption that SARS-CoV-2 has brought around the world. But it is too early to speculate about the future of the sector. The opinion of commentators on the future of the market seems to fuel the hopes of those who see in the platforms the future of the RES. This could be strongly conditioned by the push to digital transformation that is crossing over most of the sectors of society, heavily burdening those whom are resistant towards a digital transformation of their infrastructures and processes. According to Xiarewana and Civelek, the RES has suffered

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28 Baum, *PropTech* 3, 81.

29 Bellintani et al., *PropTech Monitor*, 4.

30 “Real Estate Technology Funding in 2019 Projected To Approximately Match 2018,” Venture Scanner, last modified September 29, 2019, <https://www.venturescanner.com/2019/09/29/real-estate-technology-funding-in-2019-projected-to-approximately-match-2018>.

31 “Real Estate Technology Q1 2020 Funding,” Venture Scanner, last modified May 1, 2020, <https://www.venturescanner.com/2020/05/01/real-estate-technology-q1-2020-funding>.

32 Bellintani et al., *PropTech Monitor*, 5.

33 Baum et al., *PropTech* 2020, 9.

major damage being a mainly offline industry, while the largely automated and informed industries are proving to be more resilient. The current context of crisis is pushing new ways of thinking and organizing online business, automation, but also promoting zero-touch working methods. Thus, the authors describe digital transformation “as a new way of survival”.<sup>34</sup> Indeed, despite the direct impact of COVID-19 on the RES – e.g. on land acquisition and contract sales – the digital transformation is breaking into the market scene. This represents an opportunity for PRE industry, where major real estate companies started launching measures to put together their everyday work practices with new technologies such as VR, big data, AI, cloud computing, and to promote new business models.<sup>35</sup> The authors ensure that “the human-centered management model will become a trend, and the management of human resources will gradually change from process-oriented one to scene-oriented one, from hierarchical to network-based and from modular to interactive. Digitalization brings not only the continuous evolution of technology to human resources, but also unprecedented opportunities for innovation and change”.<sup>36</sup> Under a critical perspective, some questions should be raised about the above considerations, asking who are the humans these models address? Who can afford access to certain services? Do these models stimulate the creation of power relationships in cities that tend to include the most vulnerable sections of society? Or could they foster further inequalities and the creation of (new) societal, geographical, economic and cultural barriers? In order to respond, it will be necessary to study these phenomena in depth with a multidisciplinary approach in the short, medium and long term. Aspiration that this writing cannot have.

Nevertheless, over hundreds of thousands of deaths and millions of infected people, millions of workers worldwide have already lost their jobs, been dismissed or placed on temporary, unpaid leave of absence. In particular, according to the International Labour Organization: “young people constitute major victims of social and economic consequences of the pandemic, and there is a risk that

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34 Baikeli Xiarewana and Mustafa Emre Civelek, “Effects of COVID-19 on China and the World Economy: Birth Pains of the Post-Digital Ecosystem,” *Journal of International Trade, Logistics and Law* (2020): 154.

35 Ibid.

36 Ibid.

they will be scarred throughout their working lives – leading to the emergence of a ‘lockdown generation.’” Indeed, “young people are disproportionately affected by the COVID-19 crisis, with multiple shocks including disruption to education and training, employment and income losses, and greater difficulties in finding a job”.<sup>37</sup> This can only have significant effects on the ability of individuals to access credit or pay rents, mortgages and household expenditure.<sup>38</sup>

Anyway, commentators, industry operators and entrepreneurs are becoming increasingly interested in PREs. But they tend to point out these platforms as a possible solution for the future of the RES, not only to mitigate the effects of the crisis caused by COVID-19, but also to improve the performance of the services offered, to improve development and decision-making processes, and so on and so forth. But, at least in Italy, they believe that new technologies should be combined with in-person practices, thus focusing on hybrid models.<sup>39</sup> Finally, KPMG, in its third Global Proptech Survey, explains that proptech companies are “hugely optimistic” about the future growth of their market.<sup>40</sup> Indeed, 87% of those who participated in the survey believe that real estate companies will increase spending on implementing proptech solutions in the next twelve months. While none of them expect investment to stop or decrease.<sup>41</sup>

## PREs and the urban ecosystem

Cities are desirable locations, even for entrepreneurs working in the real estate industry. Due to the contemporary characteristics of cities, e.g. socio-economic capital (concentration), opportunities, entertainment, it is no surprise that real estate developers and those working within the sector are drawn to them. The extraction of value

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37 International Labour Organization [ILO], *ILO Monitor: COVID-19 and the world of work. Fourth edition* (May 27, 2020), 2.

38 Maria Nicola et al., “The socio-economic implications of the coronavirus pandemic (COVID-19): A review,” *International Journal of Surgery* 78 (2020): 189.

39 Adriano Lovera, “Proptech, soluzioni digitali per le compravendite ai tempi del virus,” *Il Sole 24 Ore*, March 12, 2020, [https://www.ilsole24ore.com/art/proptech-soluzioni-digitali-le-compravendite-tempi-virus-AD8djj?refresh\\_ce=1](https://www.ilsole24ore.com/art/proptech-soluzioni-digitali-le-compravendite-tempi-virus-AD8djj?refresh_ce=1); Angelica Donati, “Proptech e tecnologia nel Real Estate post Covid-19,” *Key4biz*, June 5, 2020, <https://www.key4biz.it/proptech-e-tecnologia-nel-real-estate-post-covid-19/308941>.

40 KPMG, *Is Your Digital Future in the Right Hands?* (October 2019), 32.

41 Ibid.



from online and offline spaces and users' data is undoubtedly one of the most disruptive approaches of our age, since it influences lifestyles and habits. Thus, according to Zukin: "Cities today are crucial sites for both the creation of — and resistance to — a powerful interplay of land, labor, culture, and capital that forms the base of the new economy: the 'innovation complex'."<sup>42</sup>

This is the reason why we analyze the urban ecosystem underlying the relations with PREs. But before that, it is necessary to investigate the urban ecosystem approach, taking advantages of the concept of human ecology to better delineate the theoretical framework. Starting from Robert E. Park,<sup>43</sup> a founder of the Chicago School, the term "ecosystem" transcends the boundaries of biological sciences to approach social studies. According to Strassoldo, it takes the features of an "architectural" discipline, capable of producing macroscopic visions that peer into biosphere's processes.<sup>44</sup> Interestingly, three years later, in June 1996, Ben Carpenter, a system engineer at CERN, described the connectivity which marked the internet's development using architectural terminology in *Architectural Principles of the Internet*, a seven-page written memo.<sup>45</sup> The document centers on the principle of constant change, which is coupled with an architectural analogy. Indeed, according to Carpenter: "a good analogy for the development of the Internet is that of constantly renewing the individual streets and buildings of a city, rather than razing the city and rebuilding it. The architectural principles therefore aim to provide a framework for creating cooperation and standards, as a small "spanning set" of rules that generates a large, varied and evolving space of technology".<sup>46</sup>

Otis Duncan's definition of "ecological complex" is able to bring together elements such as population, organization, environment

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42 Sharon Zukin, *The Innovation Complex. Cities, Tech, and the New Economy* (New York: Oxford University Press, 2020), vii.

43 Wikipedia, The Free Encyclopedia, s.v. "Robert E. Park," [https://en.wikipedia.org/wiki/Robert\\_E.\\_Park](https://en.wikipedia.org/wiki/Robert_E._Park), accessed June 5, 2020.

44 Raimondo Strassoldo, "Ecologia," in *Enciclopedia delle scienze sociali* (Treccani, 1993), [http://www.treccani.it/enciclopedia/ecologia\\_\(Enciclopedia-delle-scienze-sociali\)/](http://www.treccani.it/enciclopedia/ecologia_(Enciclopedia-delle-scienze-sociali)/).

45 Ben Carpenter, *Architectural Principles of the Internet* (USA: RFC Editor, 1996), <https://dl.acm.org/doi/pdf/10.17487/RFC1958>, accessed June 10, 2020.

46 *Ibid.*, 2.

and technology in a paradigmatic approach.<sup>47</sup> Dunlap and Catton give a further contribution to the theory of human ecology, expanding on Duncan's model adding three main systems: cultural, social and personality, in addition to population and technology, and placing the environment at the center of the interactions.<sup>48</sup>

The important novelty of the model of interaction between environment and society is in demonstrating the fallacy of the mono-causal explanations of environmental degradation, whether they focus on the increase of the population, the distorted use of technology, organizational dysfunctions and other aspects.<sup>49</sup> Thus, as stated by Strassoldo, a certain level of indeterminacy makes these variables both dependent and independent into the analysis of human ecology.<sup>50</sup>

Finally, the public space, as the "natural area" of the city, is here conceptualized being a crucial dimension suffering the competition for territory, invasions by new groups, inequalities and socio-economic exclusion, and extraction of resources. To encapsulate the concept of public space in a definition implies, first of all, accepting its duality. The public space is, on one side, the whole of streets, squares, roadways, parks, car parks, which together are the negative of the "private". As suggested by architect Franco Purini, Gian Battista Nolli outlined in 1748's, *Map of Rome*, there exists visible contrasts in the Italian Capital between private and public spaces.<sup>51</sup> The latter is the physical extension of the public architectural space, measurable through Euclidean geometry. On the other side, according to Simmel,<sup>52</sup> Goffman<sup>53</sup> and Hall,<sup>54</sup> excluding its physical component, the public space can be considered the social space of the city, the

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47 Otis Dudley Duncan, "Social organization and the ecosystem," in *Handbook of modern sociology*, ed. Robert Faris (New York: Rand McNally, 1964), 36-82.

48 Riley Dunlap and William Catton, "Environmental Sociology: A Framework for Analysis," in *PROGRESS IN RESOURCE MANAGEMENT AND ENVIRONMENTAL PLANNING*, eds. Tim O'Riordan and Ralph Clair d'Arge (Chichester, England: John Wiley & Sons, 1979), 68.

49 Luigi Pellizzoni and Giorgio Osti, *Sociologia dell'ambiente* (Bologna: il Mulino, 2008), 75.

50 Strassoldo, "Ecologia."

51 Franco Purini, "Spazio pubblico," in *Enciclopedia Italiana* (Treccani, 2007), [http://www.treccani.it/enciclopedia/spazio-pubblico\\_\(Enciclopedia-Italiana\)](http://www.treccani.it/enciclopedia/spazio-pubblico_(Enciclopedia-Italiana)).

52 Georg Simmel, *Sociologia* (Torino Edizioni di Comunità, 1998).

53 Erving Goffman, *Interaction ritual: Essays on Face-to-Face Behavior* (New York: Anchor Books, 1967).

54 Edward T. Hall, *La dimensione nascosta* (Milano: Bompiani, 1968).

stage of interactions. While taking into account these working definitions' complexity, the public space must be understood as a single body: two faces of the same object, connected by a strong relationship of cause and effect, where intensity and direction have no obligatory directions. Craftsman and artifacts produce the cultural, societal, political and economic factors which characterize the city, due to their continuous tension. As pointed out by Guido Martinotti: cities constitute an inextricable whole, where material and immaterial components of the urban phenomenon all become equally important.<sup>55</sup>

Yet, the construction of the ideotype of public space remains incomplete without an additional step forward to delineate the qualities of the object under analysis in a more clear-cut way. Indeed, the main characteristic of the public space is its multifunctionality, not only because other characteristics derive from it, but because it is from this that the social dimension of spaces emerges. A variety of primary functions ensures the production of positive externalities at societal, economic and political levels, as pointed out by Jane Jacobs: "The district, and indeed as many of its internal parts as possible, must serve more than primary functions; preferably more than two".<sup>56</sup>

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Another peculiar trait of public space derives from the consideration of its accessibility. The more a space is usable, the more it guarantees a multiplicity of its primary functions. As Purini emphasizes: public space means the outcome of the coexistence of several categories aimed at ensuring a specific ideal, iconic and behavioral shade to the enjoyment of streets and squares.<sup>57</sup> A good degree of accessibility produces a space that becomes a resource for the city. Alfredo Mela points out that: it is a territory not appropriated by anyone; it is a meeting point on which everyone can stake the same claims.<sup>58</sup> Thus, a neutral, or intermediate ground that does not eliminate differences, but instead highlights disparities; leaving the outcome of comparison open to a wide range of possible scenarios.<sup>59</sup>

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55 Guido Martinotti, *Sei lezioni sulla città* (Milano: Feltrinelli, 2017), 30.

56 Jane Jacobs, *The Death and Life of Great American Cities* (New York: Vintage Books, 1961), 158.

57 Purini, "Spazio pubblico."

58 Alfredo Mela, *Sociologia delle Città* (Roma: Carocci Editore, 2015), 194.

59 Ugo Perone, *Filosofia e spazio pubblico* (Bologna, il Mulino, 2012).

Public space is a confrontation that is political first of all, as emphasized by the urbanist Darshini Mahadevia: what makes a great city are the public spaces within it. Cities in history are remembered for their public spaces, the Greek Agora, the Roman Forum, the European squares, and Indian 'chowks' (quadrangle open spaces). The experience of 'public' is the experience of a city.<sup>60</sup>

Historically, public space is the first place of deliberation. From the Athenian Agora, Occupy Wall Street's Zuccotti Park, to Gezi Park in Istanbul, public spaces have always contributed to the proper functioning of democracy. David Harvey expands on this further illustrating public spaces as a historically vital and fundamental part of democratic governance.<sup>61</sup> The public space is that place able to represent cities, to differentiate them from each other, and to produce unique cultural matrices.

However, the characteristics of a city requires a different reflection when it comes to contemporary public space. It is well established that urban public space is experiencing a period of severe crisis, which inevitably erodes and modifies the assumptions described above.<sup>62</sup> The leading cause of this crisis is globalization, which has radically changed the structure of cities and, in particular, of public space. This occurred due to the mutation in power relations between politics and economy, to the detriment of politics. Thus, Giovanni Semi highlights that the contemporary city – characterized more and more by neoliberal policies – has emphasized competition and entrepreneurship to the detriment of planning and full employment.<sup>63</sup> With the passage from Fordism to post-Fordism, during the 20th century, the economy has become particularly central to the sphere of individual experiences. According to Ulrich Beck, we can now talk of imperialism of the economic system.<sup>64</sup> This paradigm

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60 Darshini Mahadevia, "Public spaces make cities," *Down to Heart*, June 7, 2015, <https://www.downtoearth.org.in/blog/public-spaces-make-cities-44492>.

61 David Harvey, "The Political Economy of Public Space," in *The Politics of Public Space*, eds. Setha Low and Neil Smith (New York: Routledge, 2006), 17.

62 Michael Sorkin, *Variations on a Theme Park: The New American City and the End of Public Space* (New York: Hill and Wang, 1992); Mike Davis, "Fortress Los Angeles: The Militarization of Urban Space," in *Variations on a Theme Park*, ed. Michael Sorkin (New York: Hill and Wang, 1992), 154-180; Don Mitchell, *The Right to the City: Social Justice and the Fight for Public Space* (New York-London: The Guilford Press, 2003).

63 Giovanni Semi, *Gentrification. Tutte le città come Disneyland?* (Bologna: il Mulino, 2015), 48.

64 Ulrich Beck, *I rischi della libertà. L'individuo nell'epoca della globalizzazione* (Bologna: il Mulino, 2000), 22.

shift shows the economy not only reshaping other spheres, such as politics, but also stands as the only possible model for other areas of experience, including public space. We can argue that the contemporary city, or rather its government, sees in the public space, not a resource to be used in the social sphere, but rather in the economic one. One of the epigones of this kind of policy is the “entertainment city”. According to Amendola, this is that type of city where the party never stops, with “events” of all kinds and leisure that follow one after another relentlessly.<sup>65</sup> Today everything must be visible to exist. Just as people’s selfies have become a tool to demonstrate their existence and happiness, then so too the ‘event’ is the instrument that the city uses to assert its presence on globalization’s stage. Consumption and consumerism then too turn into an event, in the guise of shopping, where the showcases reflect the new mindscapes, culture and imaginary desires of the metropolitan man.<sup>66</sup> The fairs, the mega-events, the concerts, the contemporary art festivals are transformed into a medium to “live” the city, while consuming it at the same time. On the other hand, the further Amendola’s epigone is the “city-enterprise”. It arises from the need of the contemporary city to overcome two macro-problems that characterize our late-modern age: 90 deindustrialization and the depletion of resources received from the central state.<sup>67</sup> The increased mobility of companies has accentuated the need to go to the global market and compete with other cities to acquire the scarce resources mainly from the private sector. Private companies and capital have thus freed themselves from the constraint of proximity to production plants and have felt relatively free to move, choosing places with more significant advantages and attractiveness for both natural and legal persons.<sup>68</sup> Creativity and innovation become the basis for a new phase of regeneration aimed at attracting capital. On the political level, local governments must be thoroughly equipped to manage economic and development policies, which very often are implemented through forms that refer to the so-called “urban regime theory”.<sup>69</sup> Basing their action in

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65 Giandomenico Amendola, *Tra Dedalo e Icaro. La nuova domanda di città* (Bari: Laterza, 2010), 35.

66 Ibid.

67 Ibid.

68 Ibid., 27.

69 Karen Mossberger and Gerry Stoker, “The Evolution of Urban Regime Theory: The Challenge of Conceptualization,” *Urban Affairs Review* 36, no. 6 (July 2001): 810-35.

managing phenomena, administrations assume entrepreneurial attitudes, starting from the almost complete exclusion of weaker and marginalized social groups. Moreover, it is precisely in the degree of multifunctionality that public space shows its greatest changes. According to Semi, in a city that is increasingly dedicated to the entrepreneurship of itself, through emulation and competition, a willingness to construct squares, roads, parks and avenues and other places to cater towards value production is triggered.<sup>70</sup> This process reflects the systematic restructuring of the primary functions of these spaces. The contemporary public space is increasingly less accessible and increasingly dedicated to specific social groups. Thus, Mela points out that this leads to a “caricaturizing” of the city defined by a spatial structure consisting of sets of strictly controlled places, often monofunctional, where citizens and tourists are herded along predetermined routes.<sup>71</sup>

As mentioned, the urban ecosystem and the public space are characterized by strong changes that put them in a situation of crisis. Not for a lack of investment, but exactly for the opposite reason, i.e. the unbreakable bond between production of space and accumulation of capital since at least the mid-nineteenth century onwards.<sup>72</sup> Under a critical perspective, urban capitalism is using the extraction of excess capital as a lever capable of generating economies. However, the superseding of the Fordist system marked a watershed in the structure of urban system, no longer based on distribution of resources, but rather on competition and entrepreneurship, generating phenomena of territorial competition and emulation.<sup>73</sup> Following Duncan’s thesis, the technology is a type of stimulus for the ecosystem.<sup>74</sup> As illustrated by Hawley, it is “conditio sine qua non” for development processes.<sup>75</sup> If we focus on the main phases of urban development, we can see that technology has played a critical role

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70 Semi, *Gentrification*, 94.

71 Mela, *Sociologia*, 195.

72 Harvey, *The Enigma of Capital*.

73 Semi, *Gentrification*; Robert Jessop, “La transizione al postfordismo e il welfare state postkeynesiano,” in *Stato sociale e mercato mondiale. Il welfare state sopravviverà alla globalizzazione dell’economia?*, ed. Maurizio Ferrara (Torino: Edizioni della Fondazione Giovanni Agnelli, 1993); David Harvey, “From Managerialism to Entrepreneurialism: The Transformation in Urban Governance in Late Capitalism,” *Geografiska Annaler: Series B, Human Geography* 71, no. 1 (1989): 3-17.

74 Duncan, “Social organization.”

75 Amos Hawley, *Human Ecology. A Theoretical Essay* (Chicago: University of Chicago Press, 1986).

in the production of space and on the organizational components of society. Technologies such as iron, glass, cast iron and steel have been intensely traded all over the world, especially starting from the industrialization of the second half of the nineteenth century, coinciding with the second urban revolution and the urban transformations of Paris initiated by Baron Haussmann.<sup>76</sup> But also, oil, internal combustion engines, rubber and, in general, technologies related to mobility in Fordist cities. While, in our age, sensors, AI-based surveillance systems<sup>77</sup> robots collecting and sharing information moving through personal spaces and territories<sup>78</sup> etc. are spreading in cities all around the world. They are assuming an increasingly important role in the creation of the ‘civitas’ and the ‘urbis’. The common thread linking creation of space and technology is that of consumption through urbanization, which has become, or perhaps has always been, an absolutely central dynamic of urban capitalism.<sup>79</sup> In this new context, after a void left by the disappearance of factories in the urban skyline, cities return to be a basin of new models of development and entrepreneurship, thanks to new technologies and new forms of work and capital organization.<sup>80</sup> Thus, according to Zukin: “The reality is riskier and more complex. Under the radar, the city government plays a major role. It subsidizes business investment and specialized education so that tech companies will create jobs. It sets up tech hubs and innovation districts for real estate developers to thrive. And it deals with tech-related ‘disruptions’ in local markets and communities: ride-hailing services and short-term housing rentals, self-driving cars and electric scooters, and collection of private data by companies that offer ‘smart city’ gear. Even if they try to ride the tiger of digital innovation, mayors are held in thrall by a larger context: the reshaping of global capitalism”.<sup>81</sup> As stated by Fields and

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76 Bernard Stiegler, “New Urban Engineering, New Urban Genius,” Shanghai, November 22, 2018, trad. Daniel Ross, [https://www.academia.edu/37849730/Stiegler\\_New\\_Urban\\_Engineering\\_New\\_Urban\\_Genius\\_2018\\_](https://www.academia.edu/37849730/Stiegler_New_Urban_Engineering_New_Urban_Genius_2018_), 8-9.

77 Liza Lin and Newley Purnell, “A World With a Billion Cameras Watching You Is Just Around the Corner,” *The Wall Street Journal*, December 6, 2019, [https://www.wsj.com/articles/a-billion-surveillance-cameras-forecast-to-be-watching-within-two-years-11575565402?mod=hp\\_listb\\_pos1](https://www.wsj.com/articles/a-billion-surveillance-cameras-forecast-to-be-watching-within-two-years-11575565402?mod=hp_listb_pos1).

78 Matthew Rueben et al., “Themes and Research Directions in Privacy-Sensitive Robotics,” in 2018 *IEEE Workshop on Advanced Robotics and its Social Impacts (ARSO)* (IEEE, 2018): 77.

79 Harvey, *The Enigma of Capital*; Fields and Rogers, “Towards a Critical Housing,” 1-23.

80 Srnicek, *Platform Capitalism*.

81 Zukin, *The Innovation Complex*, viii.

Rogers, the role of the platforms concerns three specific spheres of capital management: “facilitating capital circulation and surplus capital absorption... coordinate and secure capital turnover... help constitute real estate as a financial asset class”.<sup>82</sup>

The reason for this is to be found in the nature of capitalism, understood as a phenomenon characterized by a high degree of adaptation to the perpetual changes taking place. It is not by chance that the financial crisis of 2007-2008 coincided with the collapse of the real estate market. According to Srnicek: “Capitalism, when a crisis hits, tends to be restructured. New technologies, new organizational forms, new modes of exploitation, new types of jobs, and new markets all emerge to create a new way of accumulating capital”.<sup>83</sup> In the same way, platform capitalism orients real estate investments impacting on the real estate market.<sup>84</sup>

A further topic of discussion concerns the impact of technology on society, in this case the technology applied to the real estate market. As Martins points out, the two main perspectives concern the Promethean and Faustian vision. The first is characteristic of Enlightenment and positivist thought, which sees in technology the strength capable of leading humankind towards a future of greater well-being. The second, matured thanks to Weber, Adorno and Heidegger, assumes that technology is an increasingly pervasive instrument of power, able to enslave man to the imperatives of scientific technical rationalism.<sup>85</sup> On the one hand, adopting the Promethean vision, the benefits of digital technology for the RES are innumerable: it spreads risk and creates an easier link between surplus savings pools and surplus housing demand, generating huge fortunes for all those actors who had the economic capacity to invest. On the other hand, the conditions of cities are mutating, making platforms the catalysts for those dynamics that Harvey indicates as “creative destruction”, such as gentrification, touristification or depopulation of urban centers.<sup>86</sup> Harvey developed this

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82 Fields and Rogers, “Towards a Critical Housing,” 14.

83 Srnicek, *Platform Capitalism*, 42.

84 Fields and Rogers, “Towards a Critical Housing,” 14.

85 Hermínio Martins, “Technology, Modernity, Politics,” in *The Politics of Postmodernity*, eds. James Good and Irving Velody (Cambridge, UK: Cambridge University Press, 1998), 150-181.

86 Harvey, *The Enigma of Capital*, 184-214.



concept in Marxist terms, but according to Reinert and Reinert, the expression was first brought into economics by Werner Sombart, and not by Schumpeter.<sup>87</sup>

The PREs, in the context of the urban ecosystem, operate in taking advantages from the ‘smart management’ of real estate properties settled on the urban space through “extractive platform-based business models”.<sup>88</sup> The inner logic of the platforms aims “to orchestrate maximum use-value from urban contexts by actively intervening to produce higher volume data-intensive interactions”.<sup>89</sup> Finally, according to Barns, ‘platforms urbanism’ is not a far experience for individuals, but, on the contrary, “it is intimately experienced as multi-sensory connection to ‘ambient’ environments of information... [platform urbanism] is a daily, habitual one of ambient and relational connectivity that alters our sense of space and knowledge of the urban in myriad ways”.<sup>90</sup>

Following Aalbers,<sup>91</sup> Semi and Tonetta delineate a categorization of the players actively participating within the economic urban and real estate scene. Thus, these players are: “Corporate landlords, profiting from large investment funds... Transnational wealthy elites and upper middle classes, buying deluxe apartments mostly as a ‘safe deposit box’ to preserve their surplus capital... New players of platform capitalism, such as Airbnb landlords and large corporations that contribute to channel capital flows in the most central, touristic zones”.<sup>92</sup> But, according to Shaw, despite the broad interest demonstrated by scholars investigating a wide range of issues related to PREs like Airbnb, “little is being said about the myriad other platforms that are being developed in the so-called PropTech or RETech

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87 Hugo Reinert and Erik S. Reinert, “Creative Destruction in Economics: Nietzsche, Sombart, Schumpeter,” in *Friedrich Nietzsche (1844-1900). Economy and Society*, eds. Jürgen G. Backhaus and Wolfgang Drechsler (New York: Springer US, 2006), 56.

88 Trebor Scholz, *Platform cooperativism: Challenging the corporate sharing economy* (New York: Rosa Luxemburg Stiftung, 2016): 5.

89 Sarah Barns, *Platform urbanism: negotiating platform ecosystems in connected cities* (Singapore: Springer Palgrave Macmillan, 2020), 129.

90 Ibid.

91 Manuel B. Aalbers, “Introduction to the forum: From third to fifth-wave gentrification,” *Tijdschrift voor Economische en Sociale Geografie* 10, no. 1 (2019): 1-11.

92 Giovanni Semi and Marta Tonetta, “Marginal hosts: Short-term rental suppliers in Turin, Italy,” *Environment and Planning A: Economy and Space* (2020): 6.

sectors”,<sup>93</sup> starting from the automatization of landlord’s work,<sup>94</sup> to the ‘smart homes innovations’, which have “only amplified existing inequalities within the home and reinforced dominant dynamics of property ownership and coercive economic relations”.<sup>95</sup> According to Hall, a more critical understanding is needed to investigate “three main issues – the way in which connected devices shape domestic spaces as sites of labour and social interaction, the collection of domestic data to categorize citizens and the relation of smart housing to gentrification and financialisation”.<sup>96</sup>

In this sense, the implementation of sensory equipment could be interpreted in Jameson’s terms as “the last symptom of that dissociation of the private and public, the subject and the object, the personal and the political, which has characterized the social life of capitalism”.<sup>97</sup>

Thus, according to Moreno, it is necessary to understand tech companies’ involvement in urban development processes emphasizing five trends that reflect the characteristics of the new urbanism shaped by the internet’s development.<sup>98</sup> This is strongly interfering with the urban processes and architectural practices of real estate investment. The first trend is the one of internet companies putting the real estate development at the center of their competitive strategies.<sup>99</sup> Thus, even Google is demonstrating great interest in urban development and real estate. The company presented the redevelopment project of North Bayshore to the City of Mountain View in

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93 Joe Shaw, “Platform Real Estate,” *Oxford Internet Institute*, November 7, 2019, <https://www.oii.ox.ac.uk/blog/platform-real-estate-by-joe-shaw>.

94 Desiree Fields, “Automated Landlord: Digital Technologies and Post-Crisis Financial Accumulation,” *Environment and Planning A: Economy and Space* (May 2019): 1-22.

95 Miranda Hall, “Beware the Smart Home,” *Autonomy* (November 2018), <https://autonomy.work/portfolio/beware-the-smart-home/>.

96 Ibid.

97 Fredric Jameson, “Progress versus Utopia; Or, Can We Imagine the Future? (Progrès Contre Utopie, Ou: Pouvons-nous Imaginer L’avenir),” *Science Fiction Studies* 9, no. 2 (1982): 148, [www.jstor.org/stable/4239476](http://www.jstor.org/stable/4239476), accessed June 16, 2020.

98 Louis Moreno, “Fracking sociality: architecture, real estate, and the internet’s new urbanism,” in *Data Publics, Public Plurality in an Era of Data Determinacy*, ed. Peter Mörtenböck and Helge Mooshammer (Abingdon-New York: Routledge, 2020), 131-132. [https://books.google.it/books/about/Data\\_Publics.html?id=gH\\_oDwAAQBAJ&redir\\_esc=y](https://books.google.it/books/about/Data_Publics.html?id=gH_oDwAAQBAJ&redir_esc=y).

99 Ibid.

2018.<sup>100</sup> This high-impact plan is designed to be developed on two areas widely owned by Google itself, Shorebird and Joaquin, and could include offices, homes, hotels, restaurants, shops, parks, etc. Here we notice a paradigm shift in Google's approach to the urban ecosystem and to real estate properties. Indeed, as stated by Moreno: "Google is looking to create a new image of the city, one where nature, knowledge, and society circulate in a state of dynamic equipoise".<sup>101</sup> The second one refers to hiring architects and urban designers, giving technologies an environmental form, constructing urban ecologies and complementing the communication of knowledge with internally developed technologies. According to the author, this implies "the notion that knowledge can be socially and spatially engineered through a mix of architecture and urban design marks out a new kind of real estate company".<sup>102</sup> The third trend regards the logics surrounding PEs such as WeWork and Airbnb in management and provision of real estate properties. The fourth one concerns the emergence of sensor-based technologies aimed at making more efficient and profitable the economy of the buildings, e.g. Google's Nest Labs. The fifth trend is represented by "the new urbanist ideology of collaboration and education... as a fundamentally divisive process. In Google's case, this is most clearly seen in urban housing and transport conflicts, with protests in San Francisco and Berlin over private shuttle services for Google workers and rent increases that price out the poor from urban centers".<sup>103</sup> Strictly connected to this latter trend, the project Sidewalk Toronto, proposed by a Google-affiliated company Sidewalk Labs, created conflicts among local government and citizens for concerns regarding privacy issues as well as the extent of the territory Sidewalk was going to control.<sup>104</sup> CEO Daniel L. Doctoroff announced on May 7 the impossibility to carry

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100 "A neighborhood vision for North Bayshore," Google, last modified n.d. <https://realestate.withgoogle.com/northbayshore/>, accessed June 16, 2020; "North Bayshore Precise Plan Bonus FAR," City of Mountain View, last modified n.d. [https://www.mountainview.gov/depts/comdev/planning/activeprojects/northbayshore\\_nbppbonusfar.asp](https://www.mountainview.gov/depts/comdev/planning/activeprojects/northbayshore_nbppbonusfar.asp), accessed June 16, 2020.

101 Moreno, "Fracking sociality," 131.

102 Ibid., 132.

103 Ibid., 132-133.

104 Adam Carter and John Rieti, "Sidewalk Labs cancels plan to build high-tech neighbourhood in Toronto amid COVID-19," CBC, May 7, 2020, <https://www.cbc.ca/news/canada/toronto/sidewalk-labs-cancels-project-1.5559370>.

on the project due to “unprecedented economic uncertainty”.<sup>105</sup> A similar case is the one of Facebook’s Willow Village,<sup>106</sup> “wedged between the Menlo Park neighborhood of Belle Haven and the city of East Palo Alto, both heavily Hispanic communities that are among Silicon Valley’s poorest”.<sup>107</sup> Furthermore, office spaces have been dramatically resized down to “1.25 million square feet of office space, down about 29 percent from the 1.75 million that was envisioned previously for the ambitious Menlo Park development, which is located a short distance from the tech titan’s headquarters”.<sup>108</sup>

Waiting will be necessary in order to see further updates regarding these projects. At the same time, it will be necessary to observe with critical approach the internal contradictions and societal issues these type of plans could imply for the future of the urban ecosystem, focusing on all its subsets.

Here we conclude just underlining some ideas developed along this piece.

## Conclusions

Under a critical theoretical perspective, the present contribution focused on new urbanism issues, e.g. digital transformation in real estate industry, contemporary urban capital and new technology-driven re-development practices, in the framework of human ecology. The conceptual analysis of ‘property technologies’ leads to the identification of two different terms in the scientific debate, in particular: ‘Proptechs’ and ‘Platform Real Estates’ (PREs) – used in the critical literature. While Baum’s approach is fundamental to an organic understanding of the Proptechs ecosystem, the term ‘PREs’

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105 Daniel L. Doctoroff, “Why we’re no longer pursuing the Quayside project – and what’s next for Sidewalk Labs,” *Medium*, May 7, 2020, <https://medium.com/sidewalk-talk/why-were-no-longer-pursuing-the-quayside-project-and-what-s-next-for-sidewalk-labs-9a61de3fee3a>.

106 “Willow Village,” City of Menlo, last modified n.d. <https://menlopark.org/1251/Willow-Village>.

107 David Streitfeld, “Welcome to Zucktown. Where Everything Is Just Zucky.,” *The New York Times* (March 21, 2018), <https://www.nytimes.com/2018/03/21/technology/facebook-zucktown-willow-village.html>.

108 George Avalos, “Facebook dramatically reshapes plan for village,” *The Mercury News*, May 20, 2020, <https://www.mercurynews.com/2020/05/20/facebook-huge-silicon-valley-willow-village-plan-menlo-park-tech-real-estate-develop-office-housing-hotel-retail-supermarket-restaurant-park/>.

is used along in the text as we believe it allows to observe the inner logics and contradictions which are typical of platforms. The analysis continues with a focus on the process of digital transformation in the real estate industry. In recent years, experts and business operators are paying more and more attention to these innovations, as confirmed by the increasing funding at the global scale. However, it will take time to understand if it is a trend that will be maintained: according with the analyses, emerges that the drive to digital transformation, provoked at a global scale by the pandemic, has created favorable conditions for the adoption of technologies in the sector, e.g. video calling to visit apartments, VR headsets, etc.

The second part of the paper introduces the theoretical analysis of urban ecosystem and public space in relation with the process of capital extraction. It is emphasized how the production of the urban ecosystem has become more and more tied to the accumulation of the capital. The urban ecosystem, in this post-Fordist phase, or rather neo-liberal, is characterized by the change of typical ecosystemic mechanisms. There are new groups and actors entering the global real estate market where new resources are linked to real estate rent. Thus, this implies the emergence of conflicts for the competition of the territory. In this scenario, as mentioned, PREs have become an increasingly functional tool for the extraction of resources by capital, contributing in a central way in the processes of space production: “facilitating capital circulation and surplus capital absorption... coordinate and secure capital turnover... help constitute real estate as a financial asset class”.<sup>109</sup> Ultimately, this context reverberates considerably on the urban ecosystem. Starting from Pellizzoni and Osti’s assumption, borrowed from Gallino’s thought, which underlines that the calculating and instrumental rationality of capitalism favors the development of a technology incorporating the same principles and, in turn, it is strengthened by them.<sup>110</sup> This produces an imbalance in the urban ecosystem in favor of the Promethean vision of technology, for which it is the bearer of the promise of greater well-being. However, this imbalance heralds some significant changes on the public space side. Firstly, the removal of those social groups that are not suitable for the extraction of capital, with

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<sup>109</sup> Harvey, *The Enigma of Capital*, 14.

<sup>110</sup> Pellizzoni and Osti, *Sociologia*; Luciano Gallino, *Tecnologia e democrazia. Conoscenze tecniche e scientifiche come beni pubblici* (Torino: Einaudi, 2007), 153.

the relative impoverishment of cultural capital, in favor of economic capital, as in the case of San Francisco studied by Opillard.<sup>111</sup>

Secondly, in the face of technological support always aimed at simplifying everyday life, an increase in weak social ties tending to individualism emerge. Therefore, it is understandable how to run the risk, not only the one of seeing diminished the multifunctional public space, dear to the author, urbanist and activist Jane Jacobs, but also the decreasing in the pedagogical and creative function of public opinion, proper to public space. Cities of stone and cities of flesh are parts of the same body, one essential to the other and vice versa, in a continuous flow of contamination, which determines the process of structuring, theorized by Martinotti.<sup>112</sup> What emerges from the analysis is a shift in the balance within the urban ecosystem. The current trend seems to show that the stone city is increasingly assuming a dominant position, to the detriment of the city of humans. If this is analyzed with the ecosystemic approach - and specifically through Dunlap and Catton's model of interaction between environment and society<sup>113</sup> - it is possible to observe that a new hierarchy within the urban ecosystem is being defined between the variables in play. The impact of platform capitalism on the urban ecosystem elevates technology to a pivot around which the other variables rotate. No longer just cities of humans and cities of stone, cities of data are becoming increasingly concrete and capable of transforming individual and collective human experiences into extractable capital. Thus, platform urbanism plays a key role in this process. As Barns has already argued, it is part of the daily experience of humans.<sup>114</sup> And since such a multi-sensory experience is capable of covering every area of our human life, then it is not only capable of altering our sense of space and urban knowledge in myriad of different ways, but it operates a real socio-spatial reconfiguration through the reproduction of the city "as a relational resource for data governing", but also as "an algorithmically fine-tuned" means for governing applied to environmental behaviors, that mediates the norms of sociality and

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111 Florian Opillard, "Resisting the Politics of Displacement in the San Francisco Bay Area: Anti-gentrification Activism in the Tech Boom 2.0," *European Journal of American Studies* 10, no. 3 (2015): 1-23.

112 Martinotti, *Sei lezioni*.

113 Dunlap and Catton, "Environmental Sociology," 68.

114 Barns, *Platform urbanism*, 150.

connectivity.<sup>115</sup> Thus, the main scenario considered by Braesemann and Baum implies that the RES is converting into a data market, as evidenced by the authors in their data analysis regarding more than 7,000 proptech businesses<sup>116</sup>. This trend is supported by the evidence that “there are substantially more acquisitions in the data analytics sub-sector of PropTech than in any other part of the industry”.<sup>117</sup> In addition, proptech is widely recognized as a global phenomenon, although it concerns mainly some economies: North America, Europe, China and India.<sup>118</sup>

In conclusion, two critical aspects need to be stressed. First, the steadily rising funding allocated to a more and more selected number of PREs, thus appearing to confirm Braesemann and Baum’s conclusions on data markets being usually characterized by oligopolistic market structures - where few companies or monopolies offer the sole digital services available.<sup>119</sup> Thus, it seems relevant to observe that such data commodification of the whole RES fabric leads not only to the customization of services offered to users and to the maximization of profits for the few companies dominating the market, but also to the scientific production of (physical and digital) spaces. Not only real estate properties could be subjected to a process of commodification, but also social relations, weighing this system, as said, on the entire urban ecosystem and its internal logics, which extend, among other things, towards the dissolution of the blurred line separating public and private space, more than their dissociation.

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115 Ibid.

116 Braesemann and Baum, *PropTech: Turning real estate*, 1-22.

117 Ibid., 20.

118 Ibid.

119 Ibid., 19-20.

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