Start-up urbanism: New York, Rio de Janeiro and the global urbanization of technology-based economies

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Abstract

This article investigates the variegated urbanization of technology-based economies through the lenses of a comparative analysis looking at New York City and Rio de Janeiro. Over the last decade, the former has gained a reputation as a 'model tech city' at the global level, while the latter is an example of emerging 'start-up city'. Using a Marxist-Foucauldian approach, the article argues that, while technopoles in the 1980s and the 1990s arose from the late Keynesian state, the globally hegemonic phenomenon of start-up urbanism is illustrative of an increasingly decentralized neoliberal project of self-governing 'enterprise society', mobilizing ideas of community, cooperation and horizontality within a context of cognitive-communicative capitalism in which urban environments acquire renewed centrality. In doing so, the article underlines start-up urbanism's key contribution to the reinvention of the culture of global capitalism in times of perceived economic shrinkage worldwide and the central role played by major metropolitan centres in this respect.

Introduction

In a context of advanced, increasingly multicentric globalization, cities are key to the cyclical evolution of capitalist economies, understood as inherently unstable economic systems (Sheppard, 2011): cities are often behind economic downturns and recessions, due to the volatility of their overheated real estate markets but also as spaces condensing the wider contradictions of capitalism; at the same time, they are crucial to processes of economic recovery and renaissance in which the logic of capital accumulation is constantly reinvented (Rossi, 2017). The last ten years have particularly illuminated this duplicity. In the aftermath of the global economic crisis, characterized by a new wave of austerity urbanism (Peck, 2012) and generalized fears about a 'secular stagnation' (Summers, 2014), at the public policy level there has been an explosion of interest in the growth potential of contemporary cities, especially in relation to the advent of socially interactive digital technologies. In the post-recession years, cities and particularly their central areas in the United

States and other capitalist economies have indeed emerged as incubator spaces for the phenomenon of technological start-up companies that has rapidly spread across the globalized world. In a recent report documenting the rise of the so-called 'start-up cities' in the United States, Richard Florida has emphasized how high-tech start-up businesses are spatially concentrated within inner-city districts, rather than in suburban areas, thus challenging the Silicon Valley model or, at least, offering an alternative to its spatial and socio-economic pattern (Florida, 2014). In a subsequent report, this author has expanded his view on the phenomenon, arguing that venture capital increasingly flows into top global cities in both the North and the South of the world (Florida, 2016). Richard Florida and other mainstream urban and regional economists contend that technology-oriented cities and metropolitan areas have become engines of capitalist recovery and innovation in the United States as well as in the emerging economies of the globalized world (Glaeser, 2011; Florida, 2012; Moretti, 2013).

The worldwide eruption of the start-up phenomenon sheds light on a renewed 'urban centrality' within contemporary technology-driven capitalism. Cities are no longer acting only as nodes of stretched value chains specializing in advanced producer services, as the first generation of global city scholarship particularly evidenced, but also as privileged sites for technology-intensive interactive economies. Complex ecosystems involving a wide array of actors, institutions and relational networks have taken shape at the urban level in this context. The news media have enthusiastically embraced technology-based start-up urbanism as a new promised land of socio-economic prosperity. Start-up urbanism is customarily represented as a new 'happiness industry', an emotional machine reviving capitalism's promise of happiness in a general context of economic shrinkage (Ahmed, 2010; Davies, 2015; Florida et al., 2013). For instance, *The Economist* has dedicated a special report to the start-up phenomenon emphatically entitled "A Cambrian moment", whose introduction stresses the intimately urban dimension of high-tech start-up companies:

> Start-ups are a big part of a new movement back to the city. Young people increasingly turn away from suburbia and move to hip urban districts, which become breeding grounds for new firms. Even Silicon Valley's centre of gravity is no longer along Highway 101 but in San Francisco south of Market Street (The Economist, 2014: 2).

Think tanks and foundations, drawing on knowledge and expertise provided by urban development gurus (academics like Richard Florida plus a plethora of 'global consultants'), the vast majority based in North America, have played a central role in this process of discourse production and dissemination, exerting strong influence over the public policy sphere. The resulting process of policy mobility (McCann and Ward, 2011; Peck and Theodore, 2015) has globalized the pursuit of start-up urbanism. High-tech entrepreneurial communities from all across the world portray their urban environments as 'start-up cities', using closely related jargon and discourse. At the same time, digital technologies have enabled

the circulation of this emerging culture of tech-driven capitalism beyond the role of established intermediaries acting as 'agents of persuasion' (Peck, 2002). The advent of a global start-up city has therefore become a largely decentralized discourse, despite its roots being originally associated with the US economy and society.

This article looks at two examples of start-up urbanism: New York City and Rio de Janeiro. The former has acquired a reputation as a 'model tech city' at the global level; the latter offers an example of emerging 'start-up city', where the entrepreneurial state plays a decisive role in creating a self-propulsive start-up economy. The article compares these emerging trajectories of start-up urbanism to previous policy experiments aimed at creating technopoles in different geographical contexts in the 1980s and the 1990s. In doing so, it argues that, while technolopoles revealed a logic of policy-driven regional economic development emanating from the entrepreneurialist 'late Keynesian state', start-up urbanism is associated with a neoliberal governmental rationality aiming at creating conditions for a self-governing 'enterprise society' (Lazzarato, 2009) whose ultimate goal is the pursuit of the 'entrepreneur of the self' (Gordon, 1991). Being an urban tech entrepreneur entails adopting an 'integral form-of-life', based on a combination of emotions, habits and modes of relationality, rather than simply embarking on an entrepreneurial project. According to Michel Foucault, the 'entrepreneur of the self' is a pillar of the biopolitical project of societal government in advanced liberal societies:

> The stake in all neoliberal analyses is the replacement every time of homo oeconomicus as partner of exchange with a homo oeconomicus as entrepreneur of himself, being for himself his own capital, being for himself his own producer, being for himself the source of [his] earnings (Foucault, 2008: 229).

In the current politico-economic context, the city is seen as an 'ecosystem', comprising knowledge, creativity and a variety of communities of practice, enabling the individual to become an 'entrepreneur of himself'. This ecosystem provides what we is defined here the 'cognitive-communicative capital' of cities. Urban politico-economic elites mobilize for the valorization of this capital, as the two trajectories of start-up urbanism being investigated here demonstrate in different ways, as we will see.

The article is structured as follows: in the first section, we introduce readers to the notion of cognitive-communicative capital, drawing mainly on the work of Michael Hardt and Antonio Negri, who have highlighted the affirmative dimension of biopolitical capitalism, and on that of Jodi Dean, who has analysed the communicative politics of late liberal societies after the advent of the Internet 2.0 . In the second section, the article articulates the notion of 'global start-up urbanism', showing how this notion challenges previous understandings of technopoles and informational cities. The third section presents our comparative research on New York and Rio de Janeiro. The article concludes with a discussion

of the case studies and a more general reflection on the contribution this research has to offer to contemporary debates over global urbanization and urbanism.

The cognitive-communicative capital of cities

In *Empire*, Michael Hardt and Antonio Negri started conceptualizing in a Marxist vein the contemporary informatization of production as a shift from the formal subsumption of labour under capital prevailing in industrial capitalism to the 'real subsumption' of society and life itself, which entails the capitalist valorization of knowledge, affects, communicational and relational abilities: what Marx called 'the general intellect' in his visionary 'fragment on machines' text (Hardt and Negri, 2000). In their subsequent *Commonwealth* (the third book of their trilogy on capitalism and globalization), Hardt and Negri have identified the metropolis as the privileged site of biopolitical production in contemporary societies, as it generates forms of life that add value to knowledge-intensive capitalism (Hardt and Negri, 2009). In doing so, they have offered a neo-Foucauldian affirmative understanding of biopolitics as politics *of* life rather than merely as politics *over* life (Campbell, 2012). In discussing the role played by urban environments in contemporary capitalist societies, Hardt and Negri emphasize the extractive nature of what economists conventionally define 'externalities': contemporary knowledge-based capitalism draws on social cooperation taking place outside its sphere. Apologists of technology-based start-up economies like Richard Florida and *The Economist* emphasize the idea that 'place matters' in contemporary global societies, particularly the environments of culturally thriving urban societies. In a Marxist-Foucauldian vein (see also Negri, 2016), Hardt and Negri underline the role played by urban environments as unique condensations of socio-affective relations and socially diffused knowledge which stand outside the capitalist process and are subsequently appropriated and incorporated within the capitalist circuit of valorization. Their perspective provides us with an explanation of the cities' central role within processes of economic recovery after the Great Recession of 2008-9, as politico-economic elites across the planet are increasingly investing in technology-based economies in large metropolitan centres: 'The metropolis is the site of biopolitical production because it is the space of the common, of people living together, sharing resources, communicating, exchanging goods and ideas' (Hardt and Negri, 2009: 250).

What 'the metropolis' provides to capitalist economies is indeed not only a dense environment in terms of knowledge, social relations and a wide range of interactional opportunities, but also an imaginary of excitement and social enlivenment enabled by the communicative channels offered by digital technologies. The 'language power' offered by digital technologies paves the way for the rise of a sense of 'us' (Virno, 2015), which gives the illusion of getting rid of the individualism of neoliberal societies, idealizing the experience of community as a discursive artefact (Joseph, 2002). The notion of communicative capitalism, due to Jodi Dean (Dean, 2009), helps us highlight the ways in which this process actually

takes place. In Dean's view, contemporary capitalist societies rely on intensified 'networked communications' that 'are celebrated for enabling everyone to contribute, participate, and be heard' (*ibid.*: 30). As our analysis will show, this communicative dimension is particularly strong in the urban phenomenon of start-up economies and communities, through both on-line networks and live meetings. Analysing the contradictions of contemporary democracy, Dean contends that communicative capitalism is a politico-economic formation nurtured by a series of 'animating fantasies', most notably 'abundance, participation, and wholeness': firstly, the fantasy of abundance relates to the idea that communication is not intended to produce an understanding per se (as in Habermas' theory of communicative action), but to contribute to the potentially unlimited circulation of information and opinion, even though this fantasy occults the devaluation of each specific contribution; secondly, the fantasy of participation stems from the conviction that thanks to information technologies available to everyone our actions online are politically significant; finally, the Internet materializes fantasies of unity and wholeness as this space embodies the global. The rise of start-up discourse is premised on this model of communicative capitalism, as it builds on the idea that the abundance of investment opportunities in the high-tech sector allows everyone to launch a startup, especially if this entrepreneurial endeavour becomes part of the city's business ecosystem. These 'animating fantasies' are in varying degrees nurtured by the emphasis placed on self-organization, horizontality and community within the start-up scene, but also by politico-economic strategies devised by local and national leaders, as we will see in the empirical sections of this article.

The dominant neoliberal governmental rationality looks at what we can define 'cognitive-communicative capitalism' as a strategic terrain for realizing its ideal of a self-governing 'enterprise society' through an enterpreneurialization of the self. This explains why the idea of start-up economies has become so popular within current public debates, notably among urban policy makers and city mayors.

From first-generation high tech urbanization to global start-up urbanism
The eruption of the global discourse around the rise of so-called start-up cities is a recent phenomenon, which however has significant antecedents in the early stages of the globalization era. The idea of associating high-tech companies with cities and regions traces its origins back to the late 1980s and the 1990s with the phenomenon known as the 'Siliconization' of urban and regional economies across the world, particularly within the context of the rise of the so-called 'informational cities' and 'technopoles' (Castells, 1989; Castells and Hall, 1994; Bunnell, 2002).

At that time, East Asia was fertile ground for the adoption of a model of urban and regional economic development inspired by the Californian Silicon Valley: the 'multi-media supercorridor' created in Cyberjaya in Malaysia and the techno-pole of Zhongguancun near Bejing in China are examples of state-led strategies aimed

at reproducing the Silicon Valley model in the Asian context (Zhou, 2008). Singapore is another key reference: since the early 1990s its government adopted a branding policy presenting Singapore as an ambitious 'intelligent city', creating conditions for the development of clusters of globally competitive tech industries in different domains, from information technology to the biomedical sector (Arun and Yap, 2000). In these and other Asian experiences a central role has been played by the 'developmental state'. The visible hand of state and local authorities, however, was not confined to the newly industrializing countries of East Asia. State interventionism was a distinguishing feature of technopoles in the most industrialized economies, such as in the case of the technology park of Sophia Antipolis in France and the technopolis programme in Japan (Castells and Hall, 1994). Other prominent examples of attempted 'clonization' of the Silicon Valley were Tel Aviv in Israel, Helsinki in Finland, Cambridge in the United Kingdom, Bangalore in India and the so-called digital island of Ireland, amongst others (Rosenberg, 2002; Roper and Grimes, 2005). These experiments were intended to reproduce the paradigmatic example of the Sun Belt in which the Keynesian entrepreneurial state was at the forefront of the industrialization strategy which led to the formation of high-tech clusters like the Research Triangle in North Carolina, the Orange County, the Silicon Valley (Mazzuccato, 2013). In the 1960s and the 1970s, following in the wake of the social welfare programmes pursued within the framework of Roosevelt's New Deal from the 1930s onwards, the wider US South witnessed intense economic growth particularly thanks to Federal defence programmes, which helped to establish the region as national leader in aerospace, electronics, and 'business climate' (Schulman, 1991). The 'entrepreneurial state', therefore, played a key role in the rise of what is customarily known the post-Fordist Sunbelt, bringing together a Schumpeterian emphasis on technological innovation as a motor of economic growth with a demand-driven, Keynesian approach to economic development (Eisinger, 1988).

The economic crisis at the start of the new century and subsequent technological changes led to the end of the Siliconization era as it became known in the 1990s. This first Siliconization era saw the emergence of a select circle of urban and regional spaces attracting newly formed firms and venture capital in the high-tech sector, in which a specific spatial structure of production and a related symbolism took shape (Massey et al., 1992). Three were the distinctive characteristics of these economic spaces. Firstly, the majority of high-tech projects were characterized by a model of innovation focused on the threefold university-industry-government interaction (Leydesdorff and Etzkowitz, 1997). In this context, the process of technological innovation relies on spatially contained processes of knowledge spillover, networking and institutionalization, as in the cases of technology clusters, science parks and university incubators. Secondly, in spatial terms, even though a limited set of powerful metropolitan areas such as Tokyo, Paris and London with economically and socially 'innovative milieux' already witnessed endogenous dynamics of technology-led economic development (Castells

and Hall, 1994), private and public investment and related 'high-tech fantasies' remained focused on a small number of college towns, suburban areas and semi-rural environments. The adoption of such a hierarchical and spatially selective innovation model led to leave off the map both conventional manufacturing spaces and the vast majority of inner-city areas (Massey et al., 1992). Thirdly, even though economic-political conditions substantially differed from one place to another across the globe, informational cities, technopoles, science parks and other experiments inspired by the Silicon Valley model were generally '"planned developments [...] resulted from various kinds of cooperation or partnership between the public and private sectors [...] promoted by central or regional or local governments, often in association with universities" (Castells and Hall, 1994: p. 1). In conclusion, the first wave of global high-tech urbanization - albeit differentiated in its outcomes and institutional forms and dynamics – was an example of what we could define the 'late Keynesian era', whose main features were the following: an innovation process confined to the university-industry-government interaction; a highly selective locational logic; a normative role of public policy.

In the late 1990s, an early – and ephemeral – manifestation of the post-Keynesian era was the phenomenon of the first generation of Internet-based companies, at that time known as 'new media industries', which particularly developed within inner-city areas through endogenous dynamics. However, the bust of the so-called 'dot com bubble' in 1999-2000 led to a quick unravelling of this phenomenon. A second, and still decisive, turning point occurred a few years later, in the mid-2000s. The truly groundbreaking changes occurred in the mid-2000s within the Internet with the creation of online social media (such as Facebook, Youtube, Twitter, Linkedin and other more specialized professional networks), along with the invention of new forms of community-making such as the meetups, have radically transformed the landscape and the experience itself of high-tech entrepreneurship and the related associational economies. Online and live meetings and events (variously known as high-tech meetups, 'startup weeekends', startup cups, and the like) dedicated to the high-tech business scene have proliferated in an ever-growing number of cities and towns across the globe. These actors – private or non-profit – are inspired by the principle of 'self-organization', whose aim is to create 'an ideal city where bottom-up cooperation coalesces into an ingenious and complex social organization' (Uitermark, 2016).

In aspiring or established high-tech cities, this 'ideal city' is customarily defined by startup communities and the organizations gravitating around them in terms of 'ecosystem'. Ecosystem is the key term in the lexicon of the start-up movement across the world. The notion of 'business ecosystem' was theorized and popularized for the first time by James Moore (1993), a visionary business consultant, in an article published in the *Harvard Business Review,* in which he took from Gregory Bateson, the renowned anthropologist and biologist, the idea of co-evolution to highlight the fact that innovative industrial firms do not evolve in a vacuum but create cooperative networks in order to attract capital, resources,

partners, suppliers and customers. Start-up leaders and ordinary members customarily portray themselves as complex ecosystems pursuing the ideal of high-tech communities through a wide range of live and online networks, organizations and events, while high-tech corporations are seen as participants rather than dominators within the local ecosystem. In this sense, on-line communication tools have made the difference in the move towards self-organization and autonomy and the valorization of urban environments as interactional contexts.

Similarities, but also substantial differences can be found between start-up urban economies and the associational economy patterns epitomized by the regional innovation systems investigated within regional development scholarship in the late 1990s and the 2000s. Even though the latter specialize in more traditional manufacturing sectors, as in the paradigmatic Italian industrial district model, both business systems are based on small and medium-sized firms. In an influential book, Philip Cooke and Kevin Morgan observed that the 'associational repertoire' they were scrutinizing was intended 'to empower intermediate associations which lie between state and market, be they groups of firms, trade associations, chambers of commerce, labour unions, or civic associations' (Cooke and Morgan, 1998: 22). Start-up communities revive the associational economy paradigm. However, a heightened sense of globalization appears to be the distinguishing trait of contemporary start-up communities. While firms and regional organizations giving rise to associational economies shared a place-based sense of belonging, start-up communities perceive themselves as nodes in globally stretched networks across the planet. High-tech entrepreneurs see the local interactional context as a relevant arena, but this participation in the local scene is nurtured by a sense of allegiance to the global start-up community. The urban high-tech scene, therefore, cannot be conceived without reference to the global context. On the other hand, the vast majority of start-up communities form and take shape as a way to emulate successful examples of start-up cities, such as New York, as we shall see, Austin, San Francisco, in the United States, and Berlin and London in Western Europe. This imitation process clearly emanates from the economic-cultural context of globalization understood as a discursive formation. Moreover, organizations promoting periodical events and happenings such as the Startup Weekends portray themselves as global in nature, willing to establish links with local organizations. Put it briefly, for high-tech start-up communities globalization is no longer synonym only for international markets and transnational production chains, as was and still is for firms in more conventional production systems and sectors, but is a fluid space of belonging devoted to the circulation of ideas, events, networks and the production of knowledge flows.

Comparing trajectories of start-up urbanism
The previous section of this article has identified the three following characteristics of contemporary start-up urban economies: firstly, unlike numerous projects of tech-driven urban and regional development in the late 1980s and 1990s, these

economic-spatial entities are not directly planned by state and local authorities, but local governments actively support them, contributing to a governmental rationality closely aligned with the constitution of knowledge-based capitalism; secondly, they are built upon imaginaries, discourses, and fantasies of business ecosystems comprising a variety of mutually interacting public and private actors, inspired by principles of self-organization, cooperation and autonomy; thirdly, they differ from previous experiences of associational economy in that the primary sense of belonging that unites start-up businesses comes from their embeddedness in global networks and flows of ideas, discourse, knowledge, technical expertise, rather than only in place-based intermediary institutions, as was the case for the small and medium-sized firms analysed by regional development scholars in the 1990s.

In what follows we will provide illustrative evidence of two urban contexts in which technology-based start-up economies have been at the centre of public discourse around economic development in recent times. This comparative analysis will show how the propagation of a neoliberal governmentality dictating the entrepreneurialization of society is essential to knowledge-based capitalism. In particular through the illustrative cases of New York and Rio de Janeiro we show how local politico-economic elites have become increasingly aware of the crucial role that urban environments play in technology-intensive global capitalism. The trajectories of start-up urbanism analysed here offer evidence of a variegated process of global urbanization of technology-based economies. In comparing the trajectories of start-up urbanism in New York and Rio de Janeiro, we rely on qualitative sources of information, in addition to direct observation through fieldwork (conducted in February-March 2015 in New York and in April 2015 in Rio) and the use of official documentation.

Our comparative analysis of New York and Rio de Janeiro is based on a multi-method qualitative approach, combining interviews and media content analysis. We believe that the methodological pluralism of critical urban studies (Ward, 2014) is well suited to the investigation of variegated forms of global urbanization, as those being analysed here. In the New York's case study, we draw on ten in-depth interviews conducted with qualified informants involved in the local business ecosystem, such as consultants, experts, tech community leaders and journalists (see the appendix). Our intent here has been to hear directly from local informants in order to investigate the differences between today's 'start-up urbanism' and the previous 'dot com' economy in the late 1990s, showing the way in which the idea of New York as a 'model tech city' at the global level has gained ground. The case of Rio de Janeiro is based on a detailed analysis of three major news media outlets in Brazil from 2010 to 2015: *O'Globo*, a generalist, neoliberal-oriented newspaper voicing the interests of the right-wing parties; the fortnightly *Exame*, a business magazine that speaks to the country's economic elites; *Valor Econômico*, a leading financial outlet in Brazil oscillating between the neoliberal parties and the developmentalist forces coalesced around the Workers' Party that governed from

2003 to August 2016. Here the intent is to look at the rise of the startup-city narrative within the public sphere in its early stages: the federal government and the mainstream press have largely converged in the pursuit of a knowledge-based form of capitalism exploiting the cognitive-communicative capital of Brazilian urban society, including that of its most deprived areas, the 'favelas', leaving aside the ideological divisions and political tensions that have characterized this country in recent years.

New York: a model tech-city

New York City is an example of a metropolitan area that in the space of two decades has rebuilt its reputation as a hub for technological innovation and economic resurgence, after years of structural decline. This process of urban technological renaissance has gone so far that New York's high-tech community and its politico-economic elites believe the city has become a role model for aspiring tech-cities across the world. Until two decades ago, only few experts would have predicted this scenario. In their book on the 'technopoles of the world', published in 1994, Manuel Castells and Peter Hall opposed the decline of New York City in the technology sector to the ascendancy of Los Angeles and the larger Southern California as the nation's leading metropolitan milieu in this domain:

> Until World War Two, and indeed for a few years after that, indeed much later, the metropolitan innovative milieu appeared to be concentrated where it had long been, in the corridor or axis that led from Boston to Philadelphia, but was particularly concentrated in and around New York City. This area - the crucible of the American electrical revolution of the 1870s and 1880s - still seemed, as late as 1950, to exercise a continuing dominance over the emerging field of electronics [...].If anyone had cared to predict the venue for the forthcoming marriage of space travel and electronics, surely it would have been somewhere in this corridor that joined New York, the Bell Laboratories at Murray Hill, New Jersey, and nearby Princeton University. Yet somehow, the Northeast Corridor lost this established lead (Castells and Hall, 1994: 191).

In the 1960s, the 1970s and partially still in the 1980s, New York City particularly suffered from urban decline as a consequence of the general crisis of Fordism, which affected also technology-based manufacturing firms. Having gained a reputation as an 'ungovernable city' since the 1960s, the city's declining trajectory culminated with the fiscal crisis of the mid-1970s which seriously threatened the stability and legitimacy of the city government. However, since the 1980s local politico-economic elites started pursuing a strategy inspired by neoliberal ideas aimed at rebranding New York's image as a market-friendly city (Greenberg, 2008). The neoliberal turn in local politics coincided with the expansion of the financial district, mainly as a consequence of the increasing financialization of the world economy, the strengthening of producer services linked to multinational corporations, as well as the revitalization of the real estate sector. Altogether, these factors contributed to rapidly turning New York into one of the

leading global cities across the world, but also into a paradigmatic example of socially exclusionary urbanism (Zukin, 2009). The advent of a technology-based urban economy has played a decisive role in the city's physical and societal transformation. The process of Fordist deindustrialization liberated space for new production activities in several areas of the inner city, particularly in the boroughs of Manhattan and Brooklyn. With the founding of the Internet in the early 1990s, a new generation of so-called 'techno-bohemians' emerged, giving rise to a new media district that became known as 'Silicon Alley' (Indergaard, 2004). The Flatiron District in mid-town Manhattan and the fast-gentrifying areas of Dumbo and Williambsurg became the strongholds for the new media industries and the other ventures that saw information and communication technologies as a new source for wealth accumulation and the re-creation of the city's 'creative field' (Scott, 2010).

The bust of the dot com bubble in 1999-2000, however, led to the unravelling of this first generation of technology companies in New York City and elsewhere in the Western world. This economic downturn was followed by the turmoil provoked by the 11 September attacks on the World Trade Centre. However, only a few years later, between 2003 and 2006 a new tech boom began: in the space of five years, from 2007 to 2012, over 1,000 tech start-ups were created (Centre for an Urban Future, 2012). Within a decade or so, New York would have become the second U.S. tech hub in terms of venture capital attraction, after the San Francisco Bay area and ahead of Boston, previously considered the main rival of the Silicon Valley (Florida and Mellander, 2014). A report commissioned by the Partnership for New York City, an organization representing corporate, investment and entrepreneurial firms in the Big Apple, claims that New York today stands as a model city for cities in the technology sector, even better than the Silicon Valley:

> Silicon Valley may seem like an attractive template for creating urban tech sectors, but it is unlikely that cities will be able to replicate it. Silicon Valley commercialized the fundamental technologies of the last half century [...]. Cities don't have 50 years to create a tech sector or the revolutionary technologies underpinning the Valley's rise [...]. New York City's tech sector is a much better role model for other cities. The city's tech sector has emerged in just two decades, with many of its new companies using existing infrastructure and industries like advertising, media and fashion as platforms for growth (Endeavour, 2014: 4).

According to this report, the key factors in economic-institutional terms behind this success are the dense and multifaceted networks developed by New York's entrepreneurial and angel investment communities. A vibrant community of high-tech entrepreneurs has played a key role in this success story, forming the allegedly largest meetup community in the world (around 40,000 members). New York Tech Meetup (NYTM) was created as an informal social gathering in 2004, at a time in which the first generation of 'new media industries' had almost disappeared and the new high-tech scene was just starting to take form. Six years later, in 2010, the meetup became a formal, non-profit organization, organizing a major 'demo

event' on a monthly basis. Jessica Lawrence, the executive director of NYTM when this research was conducted in Winter 2015, emphasizes the role of social media and live meetings within this community-based phenomenon:

> It was initially a community reaction to the terrorist attacks. The Internet favoured the fact of feeling connected. NY makes feeling being impersonal. NY was always the underdog in the tech industry and was not taken seriously by investors and the large public. NYers therefore proudly embraced the challenge of building a NY tech industry, which had to be something different from what used to be known as Silicon Alley. This definition is still used but it's more reminiscent of the past. We have kept a sense of grassroots organization; the principles guiding our action are: connect, educate, amplify, collaborate, advocate, inspire (Interview with the authors, February 2015).

Along with these major events organized by NY Tech Meetup, there are several other meetings and networking events being promoted at both the neighborhood and citywide levels, such as the lively Silicon Harlem meetup, a recent social venture based in the Harlem Centre of Renaissance, as well as minor events organized by technology training schools (such as the Flatiron School), designers (such as Design Driven NY) and other 'communities of practice'.

Since the end of 2014, several events are also organized within the framework of the Digital NYC initiative embraced by mayor Bill de Blasio, a partnership established with public organizations such as the New York City Economic Development Corporation (a city agency) and private corporations like IBM and Gust, the global platform of venture capitalists led by the founder of New York Angels, a NY-based investment group that has played a pioneering role in the NY tech scene (see Rose, 2014). However, some informants have dismissed the Digital NY initiative as nothing more than a 'great web portal', as a local journalist writing about technology issues related to New York City contends, because 'talk is cheap and politicians know that it's risky to invest public money in this sector' (interview with the authors, February 2015). This ingrained skepticism about the role of government reflects the conventional wisdom that 'policy initiatives have been marginally important' in the rise of New York's tech economy, as Steven Malanga – a scholar affiliated with the neoliberal Manhattan Institute, who has written about New York's 'Silicon Alley' and its resurgence (Malanga, 2000, 2006) – puts it (interview with the authors, February 2015). He rather emphasizes the positive role played by pro-business political leaders such as mayor Rudolph Giuliani and governor George Pataki in the second half of the 1990s, who enticed real estate developers willing to invest in the high tech sector at a time in which the building vacancy rate in downtown New York was exceptionally high (around the 25%). It was in this context that Bill Rudin – the descendant of a real estate dynasty in New York – created the New York Information Technology Center (NYITC), offering office space to technology firms, thereby providing a decisive contribution to transforming a decaying Lower Manhattan into a 'Mecca of the high-tech', as the official website puts it (www.55broadst.com). Even though the NYITC building is now in the process of being reconverted into mixed use, Rudin is still active on the

'tech industry' front, particularly through the Association for a Better New York founded by his father in the 1970s, of which he is currently the chairman.

These observers, therefore, downplay the role played by local governments in spurring technology-based urban economies, drawing on their experience of the first generation of Internet-based media industries in the late 1990s. In the 2000s, however, with the second wave of high-tech entrepreneurship, local leaders have become cognizant of the centrality of cities, not just in terms of real-estate values but also in terms of socially diffused cognitive-communicative capital, thus adopting a more proactive strategy compared with their predecessors. Mayor Bloomberg has launched a number of ambitious megaprojects, most notably the construction of the Cornell Tech school in the Roosvelt Island (a graduate institute combining technology and creative thinking). The new progressive mayor Bill de Blasio has associated his image with more socially-oriented initiatives, such as meetings and forums organized in peripheral districts within the framework of the already mentioned Digital NY web portal project, and the Tech Talent Pipeline designed to strengthen the city's tech workforce, which is part of a Federal initiative called Tech Hire, launched by President Obama in early 2015. At the state level, governor Andrew Cuomo has launched the 'Start-Up NY' programme, in partnership with state universities, creating tax-free zones for start-up firms within university properties, a policy that has raised widespread criticism on both the right and the left due to the small number of jobs created and the disproportionately high costs incurred (Sinquefield, 2015).

For their part, the main protagonists of the high-tech scene offer a minimalist understanding of the role of public policy, being more inclined to emphasize processes of cooperation, bottom-up mobilization and horizontality. In a recent report released in collaboration with Bill Rudin's Association for a Better New York and supported by Google (headquartered in Chelsea, Manhattan, an area with high concentration of creative industries), the NY Tech Meetup lays emphasis on the comparative advantage offered by New York's 'economic ecosystem', which comprises a variety of highly competitive sectors such as fashion, advertising, government, retail, arts and culture, all transversally touched by the technology sector (HR&A, 2014). In emphasizing the centrality of the 'ecosystem', this report is illustrative of the pro-growth partnership involving the start-up community, influential local developers and high-tech corporate giants. In this perspective, Bloomberg's idea that a major challenge for New York is to prevail over London as the prominent urban tech centre in the world (Scott, 2013) remains influential within the high-tech community, which has adopted the imperative of New York as a model tech-city at the global level. The attraction of global high-tech corporations, such as Google which arrived in New York City in 2006 expanding its offices in 2010 with the acquisition of the giant building in Chelsea (and is expected to expand further in the coming years) and Facebook which arrived in 2014 opening a stylish office in Greenwich Village, is behind this growing emphasis on global competitiveness in the last five years, while at the time of 'Silicon Alley' in the late

1990s there was no such a strategy as the so-called 'new media industries' mainly attracted the interest of developers seeking to revamp the local real estate.

These global ambitions are also the result of intentional governmental efforts, particularly during the Bloomberg era. More generally, despite views negating or downplaying the role of public policy, local government authorities importantly contribute to the pursuit of a society constructed on the idea of the 'entrepreneur of the self', even though this occurs in minimalist ways, in line with the 'thin policy' rationale of the dominant governmental rationality in neoliberal times: through physical and professional training projects enhancing NY's human capital (Bloomberg's Roosvelt Island project and de Blasio's Tech Talent initiative), through web-based communicative initiatives (de Blasio's Digital NYC project) and through fiscal incentives to start-up firms (governor Cuomo's 'Start-up NY' policy). The role of government leaders is therefore different from that played by their predecessors in the late 1990s (limited to entertaining good relationships with real estate investors at a time of exceptionally high vacancy rate even in global cities like New York) but also by the governments in the 'late Keynesian era' (normatively designing technopoles and related economic spaces). Their purpose is rather to generate a governmental rationality creating conditions for the exploitation of the city's cognitive capital and aiming at the entrepreneurialisation of society and the self. While in the late 1980s David Harvey identified the 'entrepreneurialization of urban governance' as the distinctive trait of post-Keynesian, neoliberal societies (Harvey, 1989), based on his previous theorization of the second circuit of capital (Harvey, 1978), today's post-recession societies are witnessing an expansion in the process of entrepreneurialization, involving society as a whole and the self, as envisaged by Michel Foucault in his pioneering diagnosis of neoliberal governmentality (Foucault, 2008).

Rio de Janeiro: becoming a start-up city

During the last three decades, New York City and Rio de Janeiro show parallel trajectories of urban decline and regeneration. During the 1990s, like New York, Rio de Janeiro sought to recover from a long cycle of relative decline, in this case associated with the city's loss of national capital status in 1960 and the consequent fall in public investment. Economic decline culminated with the recession of the 1980s which affected the Brazilian economy. At that time, a significant number of Rio's leading banks, industries, and research and development companies either relocated or moved their headquarters to São Paulo (Tolosa, 1996). The 1990s were therefore marked by the embrace of a number of policy initiatives mostly oriented towards the enhancement of social cohesion, economic revitalization and industrial specialization. In this context, federal, state, and local authorities supported the genesis, development and networking of scientific institutions and technology-based activities, leading the metropolitan area of Rio de Janeiro to acquire a

reputation as an emerging 'techno-pole' in the fields of energy, environment and ICTs, with an innovation system integrally linked to, and in large part built upon, its natural and environmental resources, endowments and assets (De Mello, Rocha, 2004; Botelho et al., 2010).

The second half of the 2000s saw a renewed entrepreneurialism by the federal state, using public spending as a catalyst for urban and economic growth. At this time, with the election of Sergio Cabral as Rio de Janeiro State governor (2006), and of Eduardo Paes as mayor of Rio de Janeiro (2008), both members of the centre-right Brazilian Democratic Movement Party (PMDB), a party allied with the ruling left-leaning Workers party (PT) at the federal level, Rio benefitted from significant financial and political support from all the three tiers of government. After obtaining the designation of both the 2014 Football World Cup and the 2016 Olympics Games, the three tiers of government, despite their conflicts, have mobilized closely related narratives about Rio's transformation into a city-business laboratory model (Gaffney, 2014). In this phase, Rio came to symbolize the 'Cariocas miracle' (De Queiroz Ribeiro, 2014), legitimizing the inclusion of Brazil into the exclusive circle of BRIC countries from the early 2000s onwards.

This hegemonic project, held together by pragmatic alliances and a transversal policy narrative incorporating both neo-developmentalist and neoliberal policies (Richmond, Garmany, 2016), has taken form in concomitance with the global financial crisis, which only mildly touched Brazil, whereas in previous years its fast-growing economy had created a fertile ground for digital media and e-commerce markets. This effervescence attracted foreign investors, private equity funds and bankers, giving rise to a boom in technology start-ups in Brazil. At this stage, Brazil, as other emerging economies, was particularly characterized by the phenomenon of local start-ups imitating or even cloning successful US Internet-based companies. The success of Internet startups such as Peixe Urbano (clone of Groupon) and Dafiti (clone of Amazon) thus marked the beginning of a worldwide interest for cariocan startups (Reuters, 2012).

In spite of the euphoria accompanying copycats' escalation, the increasing awareness of the limits of this phenomenon highlighted the necessity to go beyond the replication of the most successful Silicon Valley's business models. In a politico-economic context affected by a precipitous economic slowdown from 2011 onwards and by the eruption of social discontent and corruption scandals, a campaign around start-up urbanism has been launched by Brazilian elites on both sides of the political spectrum.

Since 2010, mass-media have started emphasizing the need for bipartisan consensus over technology innovation in Brazil. Echoing the criticism raised by The Economist with respect to the Brazilian model of innovation (The Economist, 2010), an editorial of the *O'Globo* argued:

> The country should consider the key contribution of multinational companies based here, especially those that have a vision, like IBM, that innovation is no longer restricted to R&D labs of large companies or universities, but it may occur even in

the slums. Through partnerships with these companies, we can not only channel Brazilian innovations in the global market, but also increase indigenous innovation (O'Globo, 2011; our translation).

The construction of a 'durable and mature innovative ecosystem' (Exame, 2012) is now premised on a bottom-up mobilization of a 'new generation of connected and integrated' technology entrepreneurs, 'able to share knowledge, kindness, education, solidarity, justice and ethics' (Exame, 2013). This conception entails a shift from a hierarchical, 'late Keynesian' and/or neo-developmentalist policy of innovation, conventionally focused on extractive industry and natural resources, to self-propulsive startup economies being able to leverage the 'cognitive capital' of urban environments.

In the emerging approach to technology-oriented economic policy, the main role of governments is to deal with contextual factors such as 'bureaucracy', 'education', 'social inequality', 'property rights' (O'Globo, 2011) as well as 'technological infrastructures' (O'Globo, 2013a), in order to create a knowledge-intensive, business-friendly environment, while, the 'innovation ecosystem' is said to be 'not dependent on official actions', in so far as 'the entrepreneurialism fostered by the government, though laudable, has a stimulus function, but it doesn't last long' (Exame, 2014a, p. 51).

The federal state has gradually adopted this new powerful start-up city discourse as an imperative for Brazil's transition towards a knowledge economy-based society. In doing so, it has incorporated the new policy rationale into its neo-developmentalist agenda by launching in 2012 'Startup Up Brazil' as part of the larger initiative 'Brazil Strategic Planning for Software and IT services'. Initially, through the Startup Brazil initiative the government hired a number of consultants looking at what leading countries in the high-tech sector, such as the US, Israel and South Korea, were doing in order to foster innovation, as well as identifying structural weaknesses within Brazil's tech ecosystem. At a later stage, the initiative has focused on the creation of public-private partnerships taking the lead in nine accelerator programs, five of which based in the city of Rio, offering consulting, financial and logistical support to early-stage tech firms (http://startupbrasil.org.br/).

In a general context marked by the preparation for the 2016 Olympics, Rio has become the largest beneficiary of the Brazilian start-up initiative, as the city boasts a unique concentration of public and private economic actors and institutions: the most competitive universities in technology and applied sciences; major government-owned corporations (such as Petrobras) and funding entities, such as FINEP (a governmental company incentivizing business in technology, science and innovation) and the national development bank (BNDES), along with a number of multinational corporations.

The state of Rio de Janeiro has joined the federal initiative, by launching in 2013 a 'Startup Rio' project, under the responsibility of the Rio's Association of Brazilian Technology Companies (Assepro-Rio). As Gustavo Tutuca, the Science

and Technology Secretary of State, points out: this project has been conceived as an 'ignition point, a stage prior to acceleration' (O'Globo, 2013b), with the aim of giving financial, educational and logistic support to 150 startup companies. According to the O' Globo, this institutional endeavour will 'stimulate startup entrepreneurial ecosystem' and 'investments in new business models based on digital technological innovations', competing locally, regionally and globally for the attraction of talent, ideas and technology (O'Globo, 2015b).

The rise of this new powerful discourse within the mainstream media and the public-policy sphere is reflected in the emergence of a vibrant startup scene, which includes a variety of actors and interests involved (businesses, governments, universities, banks, NGOs, media, local communities). A growing number of digital start-ups have thus appeared in Rio. According to the latest data released by the Brazilian Association of Startups (in late 2015), Rio de Janeiro has 335 startups, specializing in mobility devices, e-commerce, big data, social media, cloud, games, and apps. These early-stage firms tend to form micro-clusters gravitating around private incubators and accelerators, mostly localized in the central city, as well as in its western part, the Barra de Tijuca neighborhood and the southern area of the city, across the Botafogo, Flamengo and Copacabana districts.

Far from being a process triggered by a self-organized community of techno-bohemians, as in the New York case, the 'flourishing and professionalizing RJ startup ecosystem' (O'Globo, 2012a) has initially taken shape mainly as the outcome of a state-led entrepreneurialist strategy capitalizing on the work of local pioneers, such as the '21212' digital accelerator founded in 2011 (see O'Globo, 2012b; 2012c): an accelerator dedicated to start-up entrepreneurs with explicit ties to New York (Rio's code phone is 21, New York's is 212, hence the 21212 name). On the one side, public investments and related initiatives, such as Startup Brazil and Startup Rio, have enabled federal and state governments to take the lead in partnership-building processes involving investors, tech start-ups and digital professionals. In February 2015, for instance, FINEP has announced its intention to invest 450 million dollars in technological start-ups over the next three years within the framework of the 'Inova startup' programme. The project is aimed at aiding 'two thousand small technology companies needing a financial boost to flourish', particularly by removing 'legal impediments to investment funds' (Valor Econômico, 2015a).

On the other side, the growing integration of the city into the flows of policy knowledge in the high-tech sector has paved the way for a more proactive strategy of urban entrepreneurialism, city branding and the attraction of high-tech corporations. An increasing number of powerful high-tech corporations have established their presence in Rio. Intel has created a technology centre, doing research on the 'internet of things', big data and high performance computing; Cisco Systems plans to created a $500m innovation centre which includes a venture-capital fund and the co-development of new technologies; Microsoft has announced the opening in the waterfront area of its first advanced technology

centre in Brazil, which will act also as a business incubator for local start-ups. This presence induces local elites to embark on strategies of global competitiveness in the high-tech sector. According to the President of Rio Negócios, Marcelo Haddad, the IT port's project aims 'to connect Rio to other cities with digital hubs in the world, such as New York, Berlin and London' (O'Globo, 2012d).

Both state and corporate-led initiatives have taken shape in a context characterized by the circulation of increasingly pervasive pro-startup discourses and imaginaries, fostered by regular networking events, such as Startup Weekend and Startup Digest, which have pushed towards Rio's integration within the worldwide network of high-tech startups, while new platforms, such as 'Circuito StartUp Rio' and 'Startup Rio Meetup' (O'Globo, 2012e), along with a growing number of 'co-working spaces, mentors and funding agents', have disseminated ideas emphasizing the need to strengthen the local ecosystem and to foster its 'collaborative economy' (O'Globo, 2014).

Reflecting the emerging self-propulsive nature of startup urbanism in Rio, the idea of the so-called 'Brazil's silicon beach' has mobilized a multifaceted landscape of grassroots engagement involving advocacy groups, civic mapping exercises, citizen journalism, and citizen science (Watts, 2014). These organizations, mostly financed through online fundraising campaign and crowd-funding platforms, are said to lay the foundations for economic growth, social innovation and 'democratic participation'. In this context, a host of digital startups have emerged with a specific focus on Rio's slums (the *favelas*), such as Barrio Chic, which acts as a 'dialogue platform' between entrepreneurs and city dwellers; Tunnel Lab, a tech startup accelerator hub whose mission is to empower low-income young people living in the slums, through access to technology and entrepreneurship.

The emphasis on the favelas' innovation potential has become a distinguishing trait of the startup movement in Rio. Over the last years, the Brazilian NGO 'Comitê para a Democratização da Informática', under government sponsorship, in collaboration with global corporations, such as Google and Microsoft, and business platforms, such as Impact Hub and the World Entrepreneurship Forum, has launched the 'Rio Favela Startup Weekend' and 'Startup Weekend Change Makers'. This process has been described as a 'huge movement towards entrepreneurial synapses' (O'Globo, 2015), as it aims at establishing collaborative relations between slum dwellers and startup communities, finding solutions to the social problems affecting Morro da Providencia and Pavão-Pavãozinho, the areas being identified as 'pilot favelas' (www.riofavela.startupweekend.org/).

Through a combination of neoliberal and neo-developmentalist approaches and of grassroots innovation, the embrace of a 'sustainable startup movement' narrative and the dissemination of the related high-tech 'animating fantasies' have enabled the Rio startup ecosystem to incorporate the favelas into the 'circle of innovation', as recommended by The Economist in 2010, and, in doing so, to be

admitted into a 'global space of business models [...] that is not yet occupied' (Valor Econômico, 2015b). The apparent emotional engagement of the startup community with the social problems of the favelas mobilizes the slum as a socio-technical ecology (see Roy, 2011; McFarlane, 2012), as a key source of 'general intellect' and knowledge extraction, through the incorporation of its alleged 'potential for innovation' within the capitalist circuit of valorization. By exploiting this potential, according to a recent report released by Silicon Beach VCs (2014), Rio will be able to reposition itself not only as the main rival of the most competitive urban startup ecosystems in Latin America, such as those of São Paolo and Santiago (Compass, 2015), but also as an emerging global hub of policy knowledge and technological experimentation in the fields of digital technology, life sciences, poverty alleviation and social innovation.

Conclusion

Drawing on the insights of Marxist-Foucauldian interpreters of knowledge-intensive capitalism within contemporary neoliberal societies, this article has explored the phenomenon of global urbanization of technology-based economies, looking at a self-proclaimed 'model tech city' (New York) and an emerging start-up city (Rio de Janeiro). The main findings of this article have been the following: firstly, our work has scrutinized the qualitative differences between the so-called late-Keynesian projects of technopoles in the 1980s and the 1990s and the current city-based high tech boom in the globalizing world. The former were illustrative of a pattern of hierarchically organized regional development policy, while the latter are expression of a neoliberal governmental rationality pursuing an idea of global 'enterprise society' through an entrepreneurialization of the self. The neoliberal governmental rationality shapes, and is shaped by, discourses, imaginaries and fantasies constructed around notions of self-organization and cooperation. In this context, politico-economic elites have become increasingly cognizant of the 'cognitive-communicative capital' that cities have to offer to capitalist economies, particularly in a context of post-recession as in the case of New York and of economic slowdown and socio-political tensions in that of Rio.

Secondly, the comparative exercise undertaken in this article has showed the variegated, place-specific character of the process of global urbanization. Rather than identifying a homogenous global start-up city, the analysis of the two trajectories of start-up urbanism brings to light the specificities of local context in the presence of a global logic of economic development. On the one hand, 'northern elites' turn high-tech fantasies based on ideals of collaboration and cooperation into strategies of competitive urbanism, as demonstrated by New York's global leadership aspirations within the start-up phenomenon and by Rio's reproduction of the same model. On the other hand, in travelling to the South, the tech city model and the related governmental rationality of the 'entrepreneur of the self' represented by New York has hybridized with the developmentalist imperative in

Brazil, which particularly concentrates on the favelas as sites for the extraction of cognitive-communicative capital.

In more general terms, the proposed case studies provide instructive lessons concerning our understanding of global urbanization and urbanism. The relentless expansion of the start-up model of tech urbanism shows how the maximization of knowledge creation and technological innovation has become strictly dependent on processes of 'societal subsumption' to which urban societies have much to offer. Due to their unique concentration of relational and affective resources as well as communicative networks, the leading cities of both the North and the South of the world act at one and the same time as key sites for the realization of the neoliberal ideal of the 'entrepreneur of the self' and as crucial sources of knowledge extraction and production. Put it shortly, cities and particularly the major metropolitan centres acting as engines of national economies have become the social factories of global capitalism. In the final analysis, this phenomenon demands critical urban scholars paying stronger attention to the affirmative power of cognitive-communicative capitalism, in terms of production of a subjectivity forged by entrepreneurial forms of life, as the driving force behind today's global urbanization and urbanism.

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