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## For a Sociological Account of Urban Science and Technology Policies: Understanding Cultural, Economic and Political Determinants

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# For a Sociological Account of Urban Science and Technology Policies: Understanding Cultural, Economic and Political Determinants

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## Abstract

This paper is part of a broader project of research which, through the empirical analysis of urban Science and Technology Policies (STP) – in particular, policies aimed at supporting the creation and consolidation of start-ups, the technology transfer process between research and business and more in general the establishment of innovation ecosystems in urban contexts – intends to investigate the relationships between policymaking – understood in its cultural, political and economic dimensions – and the continuities or changes in accumulation strategies. The aim of the paper is to identify conceptual tools useful to investigate and understanding the aforementioned relationships in a specific urban context, starting from a critical analysis of approaches and theories covering different fields of study. After exploring some aspects of the city-capitalism nexus, in particular the recent phenomenon of start-up urbanism, the contribution will focus on critical approaches to research and innovation and urban political economy that share some theoretical assumptions that characterise the more general framework of the Cultural Political Economy (CPE). Being a grand-theoretical project, its insights can be applied far beyond its home domain in political economy, and can help to define a research program suitable to investigate the relationships between policy making and accumulation strategies in the light of the relationship between the processes of technological innovation and the political economy of contemporary capitalism. The role of political-economic imaginaries, in particular, is identified as a reference for the subsequent process of operationalisation.

*JEL codes:* H1, O3, P1

*Keywords:* urban, science and technology policies, accumulation strategies, technological innovation, imaginaries

## 1. Introduction

This paper is part of a broader project of PhD research which, through the empirical analysis of urban Science and Technology Policies (STP) – in particular, policies aimed at supporting the creation and consolidation of start-ups, the technology transfer process between research and business and more in general the establishment of innovation ecosystems in urban contexts – intends to investigate the relationships between policymaking – understood in its cultural, political and economic dimensions – and the continuities or changes in accumulation strategies. The aim of the paper is to identify conceptual tools useful to investigate and understanding the aforementioned relationships in a specific urban context, starting from a critical analysis of approaches and theories covering different fields of study.

While the city-capitalism nexus in times of globalization has several other aspects (Rossi, 2017), the paper focuses in particular on the recent phenomenon of “start-up urbanism” and the proliferation of discourses that assign cities a central role in the innovation of accumulation processes and inform urban policies on a global scale (Rossi and Di Bella, 2017).

The study of STPs has undergone several phases and involved different perspectives. After addressing the mainstream approach and its understanding of science as best organized as a literal “marketplace of ideas” (Nik-Khah, 2017), the paper will focus on the contribution of Science and Technology Studies (Sismondo, 2010) and Actor-Network Theory (Callon, 1985; Latour, 1987).

Although it has radically transformed the empirical study of knowledge production, this vast field of study has not devoted the same attention to a systematic analysis of political economy and the concept of power (Tyfield, 2012a; Mirowski and Sent 2008; Mirowski, 2011). These dimensions are instead at the center of the theorization of the Cultural Political Economy of Research and Innovation (CPERI), an approach that allows to include the insights of STS, and at the same time keep the «regularization of capital accumulation using and/or based upon technosciences at the center of the analysis» (Tyfield, 2012, 165).

Afterwards, the contribution will focus on some developments within the fields of urban political economy that are particularly interesting as regards the transformations of the cultural and economic dimensions and their articulation, and can enter into relation with the theoretical tools identified for the analysis of policymaking about science and the production of knowledge.

First, it will be briefly exposed the process that led part of that vast field of study to respond to the challenges posed by the cultural turn<sup>1</sup> by proposing approaches that try to overcome the limits of both absolute relativism and extreme economic determinism. Among these, we will focus in particular on the neo-Gramscian approach to urban political economy developed initially by B. Jessop (Jessop, 1997), and on some fundamental concepts such as accumulation strategy, historical and hegemonic bloc, hegemonic project (Jessop, 1990; 1991).

These critical approaches to research and innovation and urban political economy share some theoretical assumptions that characterize the more general framework of the Cultural Political Economy (CPE):

«Cultural political economy is an emerging and still developing transdisciplinary approach oriented to post-disciplinary horizons. It is concerned with the semiotic and structural aspects of social life and, even more importantly, their articulation. It combines concepts from critical, historically sensitive, semiotic analyses and from critical evolutionary and institutional political economy. In this context, cultural political economy refers both to an increasingly “grand theory” and to an expanding field of empirical study. (...) In brief, it combines the analysis of sense - and meaning making with the analysis of instituted economic and political relations and their social embedding.

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<sup>1</sup> «The “cultural” turn in the social sciences of the 1980s/1990s was based on the widespread denunciation of the economism of political economy. This turn is not equivalent to the emergence of “postmodernism” which signalled a deeper break with modernism. Nonetheless, the latter deeply informed the former, and culturalism and anti-economism are at the basis of the postmodern turn. Thus, although not reducible one to another, both have had an intertwined impact on political economy approaches» (Ribera-Fumaz, 2009, 447)

More expansively, it aims to produce a consistent “integral” analysis of political economy from the perspective of the interaction of its specific semiotic and structural features at the same time as it embeds this analysis into a more general account of semiosis and structuration in wider social formations» (Jessop and Sum, 2013, 1)

CPE can provide useful tools for the coherent insertion of the critique of the cultural turn into political economy, incorporating the necessity to consider topics such as discourse or identity formation in the analysis, but without reducing everything to the semiotic dimension, rather considering material and immaterial processes as co-constitutive of social relations (Ribera-Fumaz, 2009). Being a grand-theoretical project, its insights can be applied far beyond its home domain in political economy, and can help to define a research program suitable to investigate the relationships between policy making and accumulation strategies in the light of the relationship between the processes of technological innovation and the political economy of contemporary capitalism.

## **2. The City-Capitalism Nexus and its Economic and Political Significance**

The nexus between cities and capitalism, however inextricable, is a rather recent acquisition. Conventional conceptualisation of capitalism and its history reserved a marginal role for urban agglomerations, closely related to the concentration of the labour force necessary for the industrial revolution (Rossi, 2017). Today, on the contrary, the social sciences look at cities as a key element in understanding the dynamics of capitalist development and the process of globalisation (Sassen, 1991), as places that experience the contradictions of capitalism - such as exploitation and the production of inequalities - in a more intense and evident manner, while at the same time offering the best conditions for the innovation of production processes and the continuous revival of capital accumulation (Rossi and Di Bella, 2017).

The economic-financial crisis of 2007-2008, strictly related to the urban dimension due to the role played by the link between housing and finance, further strengthened interest in the connection between social phenomena related to urbanisation and accumulation processes (Rossi, 2017), producing contrasting consequences. On the one hand, the post-crisis years have been characterised, both in the US and in Europe, by the alignment between austerity policies and the processes of neoliberal urbanism (Peck, 2012; Theodore, 2020). On the other, «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» (Rossi and Di Bella, 2017, 1000).

The association between urban space and processes of innovation and technological development, however, has more remote origins. Between the late 1980s and early 1990s, several urban and regional economies across the world were the object of state-led strategies aimed at the construction of Technopoles, in the various forms of science parks, science cities, national technopoles and technobelt programmes (Castells and Hall, 1994). These attempts were intended to replicate the paradigm

matic experience of the Sun Belt, in which the industrialisation and technology investment strategy pursued first and foremost by the “entrepreneurial state” had made possible the formation of high-tech clusters – like the Research Triangle in North Carolina, the Orange County, the Silicon Valley – and contributed decisively to the development of some industry sectors (Mazzuccato, 2013).

This first era of global high-tech urbanisation, known as the “Siliconization”, led to the creation of selected economic spaces on an urban, metropolitan and regional scale, capable of attracting newly formed firms and venture capital in the high-tech sector, outlining a model with three fundamental characteristics: a technological innovation process based on the relationships between government, industry and universities; the adoption of a hierarchical and selective logic in the choice of locations for public and private investments, which remained concentrated on a small number of university towns and suburban areas, leaving most of the inner-city areas off the map; an important regulatory role of public policy and the different forms of cooperation or partnership between the public and private sectors promoted by central or regional or local governments (Rossi and Di Bella, 2017).

The economic-financial crisis at the beginning of the new century certainly represented a breaking point also for the urbanisation processes of technological innovation, but the context of high-tech entrepreneurship and the related urban economies was already transforming towards a model based on bottom-up cooperation between actors inspired by the principle of self-organisation, also thanks to the use of new online social media and the invention of new forms of social networks such as meetups (Rossi and Di Bella, 2017). Cities in advanced capitalist economies have become incubation spaces for the phenomenon of technology start-ups that has rapidly spread across the globalised world, supported by venture capital increasingly flowing into the leading global cities in both the North and the South (Florida, 2016). Thus, “start-up cities” (Florida, 2014) represent, in the interpretation of mainstream urban and regional economists, “innovation machine” (Florida et al, 2017), key players in the recovery and innovation of accumulation processes (Glaeser, 2011), thanks to the unique condensation of human and creative capital in urban agglomerations and economically flourishing metropolitan areas (Florida, 2012; Moretti, 2013).

This perspective on a self-organised economic governance reflecting the endogenous factors of urban environments - conceptualised as complex ecosystems involving a wide array of actors, institutions, relational networks, market platforms - is contrasted, in the public debate as in the social sciences, by the neo-Keynesian approach, which reasserts a more proactive role for the state in the economy through an expansionary fiscal policy entailing greater investment in technology and infrastructure (Rossi and Moiso, 2019). In particular, Mariana Mazzuccato challenged the idea of the state as an inertial force devoid of dynamism, advancing the notion of the “entrepreneurial state” as an actor that plays a key role in the mechanisms of value creation, thanks to its high capacity to invest - also financing both basic and applied research - which allows it to act as a high-risk-taking venture capitalist (Mazzuccato, 2013). Beyond both normative models, a “start-up economy” can be conceptualised as a form of strategic urbanisation of a “start-up state” - understood as a political, economic and cultural formation - that in this way «seeks to capitalise on the endogenous entrepreneurial capacity of urban environments»

through a «geographically selective as well as institutionally variegated process» (Rossi and Moisiso, 2019, 3).

### **3. Challenging the “Knowledge Economy Credo”: towards a Cultural Political Economy of Research and Innovation**

Among the different configurations of science and technology policy, the neoliberal approach currently holds a dominant position (Tyfield, 2012). Science and applied knowledge play certainly a key role in the broader neoliberal political and ideological project (Mirowski, 2011), which in fact promoted a reorganization of their production supported by what has been defined as a “knowledge economy credo”, based on four dogmas, which STPs are based on:

First: Science (Research & Innovation) contributes substantially to economic growth, and funding of R&I is best legitimated in such terms;

Second: hence R&I may be best explained and arranged in terms of a “marketplace of ideas”;

Third: hence domination (of R&I) by corporate and speculative entrepreneurial investment ensures a unique dynamism and productivity in R&I, presumptively to the maximized benefit of all (especially as consumers and investors);

Fourth: Such R&I can be expected, given time and investment, to resolve (or at least optimally to tackle) all social challenges with which it is tasked (Tyfield et al, 2017, 6).

As Mirowski (2009) has shown, neoliberalism proposed a radical interpretation of these prescriptions, placing them at the basis of a general rethinking of the market and knowledge and their relationship, which is among the main causes of its strategic efficacy. Within a vision of science as a “marketplace of ideas” (Nik-Khah, 2017), maximizing the production and consumption of knowledge has meant maximizing subjection of human social life to markets, as the ultimate and decision-makers (Peck, 2010).

Critically discussing these claims has provided useful tools for moving towards a political economy of science capable of understanding the nature and trajectory of neoliberalism itself, alongside the specific issue of the transformations in the production of knowledge that occurred in tandem with its affirmation (Lave et al, 2010; Tyfield, 2012; Mirowski, 2014).

Regarding the first dogma, since the work of Schumpeter (1934; 1942) knowledge production and innovation have been identified as distinctive features of market economies and invoked as the key to progress and development. A recent strand of research has, however, shown how the excessive exclusion and blockage in the utilization of knowledge resources, as a result of an R&I funding regime that makes decisions based on the possible use of research for commercial purposes, provokes stagnation of innovation and in particular of private sector investments. According to this interpretation, «the dynamics leading to a reduction of investment opportunities» would be a consequence «of the escalation of knowledge enclosures associated to the strengthening of the intellectual property (IP) system and the weakening of the traditional institutions of “Open Science” » (Pagano and Rossi, 2017, 57).

Coming to dogma number two, the entire conception and project of the marketplace of ideas (MoI), which has become the dominant public framing for thinking about R&I, is supported by a logic that provides for a continuous expansion of markets contending private ownership of knowledge and the systematic decrease of a legitimate discourse and institutional capacity of public knowledge production (Tyfield et al, 2017). The political success of this conception was built on two only apparently contradictory commitments: the demand for research freedom, but in an open marketplace not an academic arena of scholarly debate, and the strong claim that the process of knowledge production must be guided by the idea of the superiority of the market and its needs (Nik-Khah, 2017). This has then driven a deepening acceptance and empowerment of a knowledge production regime that, in both these commitments, represents «the definitive repudiation of conceptions of science as a self-justified “republic” of rational-empirical argument productive of public knowledge, by attempting to subsume this republic of science within economic marketplaces» (Tyfield, 2012, 156).

Dogma number three concerns the concrete manifestation of the MoI. The claim of a unique dynamism from this model of R&I has been challenged by showing the multiple negative effects made increasingly apparent from organizing innovation as a financialized market, based on a model of maximizing shareholder value (Lazonick et al, 2017). In particular, it was highlighted how neoliberal R&I policies frequently lead to a crisis in the production of knowledge and its corollary, a deepening crisis of policy legitimacy (Randalls, 2017), that, «perhaps ironically, further substantiates a claimed need for more and deeper neoliberalisation of science and science policy as the “depoliticized” solution currently to hand» (Tyfield et al, 2017, 9).

Speaking about the crisis of legitimacy of a particular R&I funding regime and the policies that support it inevitably leads us to the discussion of dogma number four. Indeed, the affirmation of neoliberalism has been sustained by a further strengthening of discourses describing innovation as: «a panacea for every socioeconomic problem, with little analysis of what these problems are, and of what the collateral impacts of the innovation would be» (Godin and Vinck, 2017, 2). This “pro-innovation bias”, that has characterised the field since its beginnings (see Rogers, 1962), concerned not only mainstream academic research – that treated innovation processes only as a dependent variable, thus focusing on the negative effects that they can suffer from other types of processes, and not on those they can generate (Sveiby et al, 2012) – but also the public policy sphere.

During the last twenty years, technological innovation - understood as a process related to the commercialization of new goods or inventions, from conception to diffusion (Godin, 2016) - has conquered the policy agenda(s) and determined a homogenization of the STPs that affects all scales of policy making. Godin (2003; 2006a) has shown how relatively independent investigations of innovation by three separate communities - scientists (including social scientists), management theorists and economists - have merged into the homogeneous concept that now informs science policy of governments around the world, aimed at promoting the “linear model of innovation” (Godin, 2006b).

By exploring the reciprocally conditioning relationships between technological practices and socio-political institutions and processes, STS challenge the understanding of science in terms of a market which belongs to mainstream economic perspective.

STS are a broad programme of research for the empirical study of the production of scientific knowledge and scientific institutions, as well as of their interaction with social (-technical) change (Sismondo, 2010). Although incorporating a wide range of perspectives, the discipline is founded upon a broadly constructivist understanding of science as a social phenomenon, as a complex social and cultural practice, and investigates how social factors penetrate right to the very heart of scientific research, and indeed, are inseparable from it (Tyfield, 2012a).

STS represent an innovative approach within the sociology of scientific knowledge, which is also subject to the implications of social control and social interests like any other form of knowledge (Gherardi, 2000). The production of knowledge, thematised in its connection with power, can be placed within an ecosystem, to be observed through the lens of an “ecology of knowledge” that rejects the classical dichotomies of functionalist thought – between nature and society and between social and technical – and answers questions concerning actors’ beliefs about the social order, the relations between work practices and social change, the nature and purpose of social innovations, and the construction of language (Star, 1995).

The same questions can also be addressed to political and administrative action, since any programme of social reform springs from a set of beliefs about the social order – and helps to reproduce it, follows a trajectory of institutionalisation or decay and requires an organisational apparatus that translates it into working practice, supported by a mobilisation of interests and the exercise of power (Gherardi, 2000). Every process of social ordering, by linking people, machines, texts and organisations (Law, 1994), generates a movement, a mobilisation of interests, themes, people and concepts, which gives rise to a network of constraints and resources. This process, through which a heterogeneous plurality acts as a single actor, has been described through the concept of “actor-network” (Callon, 1985), which later connotes a set of studies known as Actor-Network Theory (ANT). In particular, Latour proposed the concept of the “black box” - borrowing it from cybernetics - as a metaphor for the moment when cohesion is achieved between different actors, who become something organised and act as a unit (Latour, 1987).

STS thus radically transformed the empirical study of knowledge production by bringing together numerous social science approaches. At the same time, we can observe the neglect of political economy and little, if any, theorization on the relationship between innovation and capitalism (Mirowski, 2017; Tyfield, 2012b; Walsh, 2021). The dismissive attitude to social structures and totalizing social critiques can be attributed in part to the «field’s dominant micro-scale focus on the particularities of scientific practice, in particular (academic) labs and field sites», or also to «its foundation in heated debates about constructivist, anti-realist philosophy of science that elicited a deep-seated empiricist disposition towards anti-structural, including non-marxist, approaches» (Tyfield et al, 2017, 3). STS’s neglect of political economy includes neoliberalism and its implications for STPs and the R&I funding regime (Radder, 2010) and «leaves a gaping hole in its analysis that is particularly exposed in times of economic crisis when the political economic conditions of ongoing technoscience and its politics are undergoing profound change» (Tyfield 2012, p. 161). For its part, mainstream economics of R&I shows little interest in including cultural-political dimensions in issues of knowledge producing. On the other hand, political economy approaches do not often deal with knowledge production processes. A more comprehensive political economy of research and innovation, therefore, seeks



to «draw on and continue the attention that STS scholars have given to the culturally constructed aspects of science and technology, but also to show how science is a force of production, embedded in the broader economic, political, and social institutions and relations of modern capitalism» (Tyfield et al, 2017, 3).

In fact, although the STS have raised important questions about how certain categories – science, policy, technology – are negotiated in concrete rather than being established in the abstract, the focus on the concrete process of co-production has led to the neglect of the question of the origin of the structures denoted by these categories, renouncing to tackle on the analytic level what the dominant concepts presuppose (Tyfield, 2012a). This challenge was taken up by the CPERI, which:

«explores an historical ontology of the real presuppositions of other key categories of contemporary social life, notably markets/exchange value and state/citizen/government, that remain crucial elements of science-politics but are typically backgrounded in STS. If successful, it will move beyond the overstated philosophical anti-realism, which continues to undermine the critical capacity of STS including its analysis of science/politics/democracy, towards a “transcendental constructivism”. Thus, CPERI is a form of analysis that is relational but critical, situated but conditionally able to draw independent conclusions, power attentive and strategic but still epistemically coherent, allowing for the reintroduction of inescapable analytical dualisms between science and politics, epistemic and political reason etc... while acknowledging their ontological inseparability» (Tyfield, 2012, 160).

Addressing the issues of research and innovation through the conceptual tools of the CPE allows to include the insights of STS, and at the same time keep the regularization of capital accumulation using or based upon technosciences at the center of the analysis. This regularization of an accumulation regime implies a “social fix”, that is a way of regulation, which feeds and supports the specific dynamics of the capital relationship in a given context through the articulation of its economic and extra-economic elements, thus ensuring that different forms, institutions and practices can mutually support and reinforce each other (Jessop, 2002). Given the central importance of technoscience in contemporary capitalism and the leading role in fostering economic growth and overcoming crises assigned to science in the neoliberal project, «not just science and policy is being negotiated in a neoliberal technoscientific program (i.e., the subject of STS and STP studies) but the many inherent tensions of neoliberalism itself», while «social studies of science that systematically ignore political economy are simply of dubious assistance» (Tyfield, 2012, 161).

The CPERI approach differs clearly from the STS one not only in terms of the economics of science, but also in the conception of power. In fact, STS remain anchored, more or less explicitly, to a “juridical-discursive” conception, according to which power is primarily associated with the ability to exert coercion on others, and is defined in opposition to legitimate and consensually accepted rules (Tyfield, 2012). Foucault (1976) stressed that in the Western political tradition, power has always been represented in terms of rights and possible repression, within a conception that understand the freedom of a subject and the demands of political sovereignty as opposed.

Foucault himself proposes an alternative approach, addressing some important features of this juridical conception. First of all, he argues that power is not a thing, a substance, but must be understood in relational and strategic terms: «power is not

an institution, and not a structure; (...); it is the name that one attributes to a complex strategic situation in a “particular society” » (Foucault, 1980, 93). He also challenges the macro-political perspective that traditionally identifies power with political power and focuses the analysis on state institutions, and proposes to overturn this point of view: «processes of power (...) do not originate in a centralized point to pervade the social space. On the contrary, it is power relations in society that account for the generation and the functioning of the state» (Lemke, 2010, 32). Finally, the idea that power relations are not characterized solely by means of repression, but can play a productive and ontologically necessary role for the construction of all human creations - including institutions and technologies - opens up the possibility for STPs studies to investigate how technoscientific developments interact with and reconstitute power relations, and to address the questions mentioned above regarding regularized capital accumulation (Tyfield, 2012).

#### **4. The Articulation of Economic Strategies and Political Projects in Urban Accumulation Strategies**

In a context hitherto largely influenced by the Chicago school and its approach, strongly based on the urban morphology of Chicago and other American cities but capable of spreading, starting from the period between the two world wars, up to the other side of the Atlantic (Savage et al, 2003), the 1970s saw the emergence of political economy as the dominant approach in the field of urban studies. At the same time, urban policies have also undergone a process of radical change, which in the 1980s led to the spread of supply-side economic policies and the promotion of an entrepreneurial city model (Jonas and Wilson, 1999). In particular, the new governance models were characterized by the promotion by local governments, «typically in alliance with private capital», of an economic development «essentially concerned with the prosperity of local economies and their ability to attract investment and jobs», and «less concerned with the provision of welfare, services and collective consumption» (Hall and Hubbard, 1996, 154)<sup>2</sup>.

Although both Molotch (1976), with the growth machine thesis, and Stone (1989; 1993) with the theory of urban regimes<sup>3</sup>, had already shown that the debate on power in cities must be addressed in relation to the broader economic and political context, it is thanks to the strand of New urban politics (Cox, 1993) which spreads the awareness «that urban politics can no longer be analyzed in isolation from the larger political and economic forces that shape the development, restructuring, and redevelopment of urban spaces and places» (Jonas and Wilson, 1999, 11).

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<sup>2</sup> Since the 90s, a branch of the UPE has connected the issues of entrepreneurship with other urban processes, giving rise to what is now termed neoliberal urbanism (Brenner and Theodore, 2002; 2005; Brenner et al, 2009).

<sup>3</sup> Urban regimes identify a specific type of urban power structure. They constitute relatively stable governing coalitions, through which public actors and private interests act together to address economic and social challenges, making and implementing public policy decisions. The paper will focus on the neo-Gramscian interpretation of the regulation of urban regimes proposed by B. Jessop.

In the same period culture, including science and knowledge, became an increasingly explicit and decisive part of urban economic strategies, and consequently «urban political economists also started to think seriously about the role of culture and discourses in the production of urban strategies» (Ribera-Fumaz 2009, 450). They were therefore faced with a context of redefinition of the very nature of an “entrepreneurial city”, in which the promotion of simple supply-side policies is replaced by a Schumpeterian vision of entrepreneurship based on the creation of new profit opportunities through new combinations of innovations (Jessop, 1998).

In this context, the cultural turn challenges the materialist-economic views of urban political economy and its dominance within urban studies, giving rise to three main changes:

«First, urban economic research has shifted away from the question of uneven development, which was central to UPE, and towards analysing the role of culture in production distribution and consumption processes and the firm. Second, the cultural turn, coupled with a “spatial turn” in social sciences, has led to a vast literature with contributions to urban debates opening a multiplicity of new directions and approaches: from studies in gender to ethnic networks, postcolonialism, sexual identities, performance, everyday life, virtual spaces. Third, the interest in culture has opened a Pandora’s’ box concerning the conceptualization of the culture economy relationship, in particular around which variable is driving the other» (Ribera-Fumaz, 2009, 452).

The result is the flourishing of an extremely complex variety of perspectives on the articulation of culture and economy (Le Galès, 1999). In particular, the neo-Gramscian approach to urban political economy (Jessop, 1997) explicitly takes into account the articulation of economic strategies and political projects - both understood in the light of the relationship between discursive formation and material processes - in specific accumulation strategies, or courses of action promoted by actors for advancing their interests in the urban context in which they are embedded (McGuirk, 2004). According to this perspective, an urban regime can be analyzed by connecting accumulation strategies – that give an account for how «struggles over the economic and social modes of economic regulation play a key role in shaping and unifying different supranational, national, regional and local modes of growth» (Jessop, 1997, 61) – to the formation of local “hegemonic bloc” and “historical bloc”.

Following Gramsci, «an historical bloc can be defined as an historically constituted and socially reproduced correspondence between the economic base and the politico-ideological superstructures of a social formation». Sheltered from the rigid interpretations internal to historical materialism on the structure-superstructure relationship, this concept can therefore be understood as «the complex, contradictory and discordant unity of an accumulation regime (or mode of growth) and its mode of economic regulation» (Jessop, 1997, 56).

An accumulation regime consists of the dominant and relatively long-lasting configuration of the process of capitalist accumulation, even in the urban space, and is determined by the conflicting or cooperative relationships established by the actors of a specific context, albeit within limits established by the mode of production and distribution of resources. The concept of mode of regulation, on the other hand, refers to the political, institutional and cultural/ideological elements that contribute to the reproduction of the accumulation regime. Accumulation regime and mode of

regulation combine to form the development model of a given urban space, «within a dialectical relationship that can be interpreted as the co-constitution of the accumulation regime as an object of regulation in and through its co-evolution with a corresponding mode of regulation» (Jessop, 1990, 310).

Following this interpretation, an urban regime corresponds to the development model that emerges from this dialectical relationship, whose stability or propensity for change is determined by the relationships among actors of a given context. Alliances and conflicts between different class fractions<sup>4</sup> can in fact cause changes in the accumulation space, therefore it is important to focus on the relationship between local accumulation strategies and prevailing hegemonic projects. The latter help to ensure the relative unity of different social forces by mobilizing them in support of «a concrete program of action that asserts a contingent general interest in the pursuit of objectives that explicitly or implicitly advance the long-term interests of the hegemonic class (fraction)» (Jessop, 1997, 62).

It is precisely by discussing class alliances and national-popular forces mobilized in support of a given hegemonic project that Gramsci introduces the concept of hegemonic bloc:

«it refers to the historical unity, not of structures (as in the case of the historical bloc), but of social forces (which Gramsci analysed in terms of the ruling classes, supporting classes, mass movements, and intellectuals). A hegemonic bloc is a durable alliance of class forces organized by a class (or class fraction) which has proved itself capable of exercising political, intellectual, and moral leadership over the dominant classes and the popular masses alike. (...). Although this argument applies principally to the national state, it can also be used in studying supra- and sub-national regimes» (Jessop, 1997, 57).

The concept of hegemony is another clear reference to Gramsci's work and his understanding of the relational and strategic nature of social power, as well as its coercive and consensual dimensions. A hegemonic bloc, to become such, needs to produce political-economic imaginaries that hold together the interests and objectives of different fractions of capital in common accumulation strategies, also guaranteeing their extra-economic conditions (Jessop, 2010). At the same time, this principle of generalization of interests and objectives must be shared by a part of the subalterns, giving rise to a form of hegemony that emerges in the neoliberal phase and has been defined as “two-nations” hegemony:

«To suggest that hegemony wins almost universal support is misleading. (...) The problem can be clarified by distinguishing between “one nation” and “two nations” hegemonic project. Thus “one nation” strategies aim at an expansive hegemony in which the support of the entire population is mobilised through material concessions and symbolic rewards (...). In contrast, “two nations” projects aim a more limited hegemony concerned to mobilise the support of strategically significant sectors of the population and to pass the costs to other sectors (...). In periods of economic crises and/or

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<sup>4</sup> The concept of class fraction is used to analyze the organization of conflicts and alliances and how these contribute to structuring the space of accumulation. In this case, following the theory of Clarke (1978), it can represent a theoretical tool useful for understanding the way in which the primary function that an actor performs in the accumulation process shapes the interests and objectives of the actor himself.

limited scope for material concessions, the prospects for “one nation” strategy are restricted (...), and “two nations” strategies are more likely to be pursued» (Jessop, 1991, 176).

## Final remarks

The objective of the paper was to extrapolate, from the analysis of the critical approaches to innovation and urban political economy on which the attention was drawn, useful concepts for a sociology of urban STPs that is able to account for the articulation between economic, political and cultural dimensions of the relationships between policymaking aimed at science and knowledge production and the accumulation strategies carried out in cities.

Given the central importance of technoscience in contemporary capitalism and the leading role in fostering economic growth and overcoming crises assigned to science in the neoliberal project, a CPERI provides useful tools to understand how not only science policies are negotiated in a neoliberal techno-scientific program, but also various tensions concerning neoliberalism itself. This takes place through the recovery of themes of political economy, an indispensable tool particularly in times of economic crisis, when the political and economic conditions of ongoing technoscience and its politics are undergoing profound change. About the second dimension discussed, the understanding of the social nature of power as not only coercive and characterized by means of repression, and the consequent idea that power relations can also play a productive role in the construction of all human creations, allows STPs studies to analyze how techno-scientific practices are influenced by power relations and at the same time contribute to reconstitute them (Tyfield, 2012).

The developments of the CPE can be incorporated even into the study of the urban dimension, of the articulation between economic and cultural aspects in the urban space, adopting a cultural perspective on the city which does not forget the material aspects of economic processes, and using the tools of political economy in a way that recognizes the limits of merely materialistic accounts of urban processes (Ribera-Fumaz, 2009). For the purposes of this contribution, the theme of new economies and new economic spaces takes on particular relevance, addressed by CPE analysis that focus, in a context of growing predominance of Knowledge Based Economy narratives and discourses, on the role of economic imaginaries in modifying the meaning of “economics” (Jessop, 2004; 2005; Jessop and Oosterlynck, 2008; Fairclough, 2000).

For example, contemporary start-up urban economies are sustained by a process of discourse production and dissemination, in which the knowledge produced by mainstream academics and conveyed by foundations and think tanks has played a fundamental role also in influencing the public policy sphere. This process has led to a standardisation of policies on a global scale - albeit within a variegated process - sustained by the circulation of pervasive pro-start-up discourses and imaginaries, capable of overcoming the political, cultural and economic differences of specific contexts (Rossi and Di Bella, 2017).

Among the different perspectives that – responding to the challenges posed by the cultural turn – question the articulation between economy and culture on an urban

scale, the analysis focused on the neo-Gramscian approach to urban political economy (Jessop, 1997), for its capacity to account for the articulation between material and semiotic practices in cultural, political and economic processes that constitute a city, identifying some concepts that will be used in the subsequent fieldwork phase. The elaboration of a theoretical framework is indeed functional to the subsequent operationalization process for the empirical analysis of a specific object, such as policies sustaining the establishment and consolidation of innovation ecosystems in Italian urban contexts. These policies, like any political-administrative action, produce specialist knowledge that is then translated into practice. The ANT provides a set of conceptual tools, which can be operationalised to address questions about how such scientific knowledge is produced, how its constitution leads to the development of new social relations and groups, and how science and technology help structure power relations between these (Gherardi, 2000). In particular, four stages can be found in the process leading to the formation of an actor-network: problematisation, which not only constitutes the formulation of the field of research but also defines the identities of the actors and the links between them; affectation, as a set of actions through which one actor, or group of actors, seeks to stabilise the identities of the others, excluding the alternative definitions that arose in the problematisation phase; enlistment, a possible successful outcome of the previous phase, in which actors accept and carry forward the assigned roles; and the progressive mobilisation of actors who form alliances and act as a single force (Callon, 1986).

Policies and models of action are also supported and legitimised by political-economic imaginaries through the process of meaning production (semiosis) (Jessop, 2010). Imaginaries are socially constructed, historically specific “systems of meaning” or “regimes of truth”, connected to networks of social relations and institutional ensembles in which economic and material interests also count; rhetorics, often communicated in the form of a narrative, which have both cognitive and normative components (Jessop and Sum 2013).

Due to their characteristics of breaking the consolidated framework, crises are particularly significant moments for analyzing the interaction between semiotic and extra-semiotic factors and processes, since they often produce effects of cognitive, strategic and practical disorientation, influencing the sedimented worldviews of the actors and opening the space to processes of variation, selection and retention of the imaginaries:

«They disturb prevailing meta-narratives, theoretical frameworks, policy paradigms, and/or everyday life and open the space for proliferation (variation) in crisis interpretations, only some of which get selected as the basis for “imagined recoveries” that are translated into economic strategies and policies – and, of these, only some prove effective and are retained» (Jessop, 2013, 237).

The concept of imaginary can therefore be operationalized and used as a tool in order to understand and interpret the processes of variation and selection that led to the affirmation of innovation as a hegemonic concept and reference of policies on all territorial scales. This concept will therefore be placed in connection with an accumulation strategy, which acts and relates to a given economic space. To this end, a shift is needed from the mainly semiotic analysis of individual texts to «a concern with the semiotic and extra-semiotic mechanisms that together shape the

variation, selection, and retention of particular imaginaries» (Jessop, 2010, 340), from discourse analysis to thorough CPE analysis capable of including semiotic and extra semiotic (material) factors in the analysis of the processes of variation, selection, retention of specific material and discursive practices (Fairclough et al, 2004; Jessop, 2004).

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