Decoding urban development dynamics through actor-network methodological approach

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ABSTRACT

Due to growing social and physical transformations, contemporary cities reveal the profound necessity of proper scientific approaches that are adjusted to conditions of global complexity and dynamic patterns of development. Predominance of an overall market economy, sporadic deregulations of administrative powers and a lack of local investment or resources, dominate urban reality. Incongruous urban decision-making procedures result in contextually inappropriate and incoherent urban management. We will explore these operational elements in Savamala neighbourhood in Belgrade. The actor-network theory (ANT) is applied to analyse the hyper dynamic circumstances of transition in Serbia. An unclear regulatory framework, powerful financial means for investment and limited institutional influence of citizen participation, deploy unstable urban development modalities at the neighbourhood level. ANT offers an insight into how urban norms, projections and structures unfold and how associations and translations of urban elements develop. Plausible yet complex collisions in Savamala constitute a challenge for ANT in mapping urban development processes and visualizing actors and networks through diagrams. Based on the presented results, the illustrative perspective of ANT minimizes both the importance and the influence of the permanence of urban structures across time and space. Instead, ANT deals with a city as a contingent, fragmentary and heterogeneous, yet persistent product of actors, their roles, associations, agencies and networks. Possible adaptations of ANT should respond to the needs of non-scientific actors and practitioners for an interpretive tool that addresses undercover processes and mechanisms or provides explanations, recommendations or operational diagnoses on how to absorb urban development dynamics.

1. Introduction

Due to growing social and physical changes that intensify as globalized models of profit maximization, consumption and information networks (Harvey, 2012) continue to spread, cities are gradually reorganizing at the spatial and social levels. Although accelerating urbanisation is a global process, its forms and meanings vary depending on local conditions (Bolay, 2006). This ongoing urban development has made cities the primary link between local realities and global social, political and economic forces (Yates and Cheng, 2002; Tsenkova, 2006). Accordingly, a heterogeneous, iterative urban development approach can surpass the perception of cities as merely economic, social and cultural venues and treat them as complex, dynamic urban systems. For this, research and analysis techniques and methodologies that take into account the complexity and dynamics of cities are necessary to improve living conditions in them and facilitate social interactions in the urban development process.

Urban research must be spatially and temporally adapted not only to global markets, consumption patterns and information transfer, but also to local socio-political constructs and cultural identities (Marcuse and Van Kempen, 2008). In other words, we must examine not only how countries/cities interface with the global economy, but also the local social, cultural and historical legacies that each of them carries in the era of globalization (Robinson, 2006). Such research approaches should take into account how cities' functions are shaped by human action and non-human materials, which in turn are influenced by the spatiality and history of the city itself. Research on any urban system should therefore be based on data from both local interactions and global structures, and include human and non-human entities. Technically speaking, the problem of how to simultaneously handle the dynamics and structure of cities as complex systems persists.

Following contemporary relativist trends as regards rethinking space, time, globalization and cities, the challenge for future research is "visualizing cities as unformed, unorganized, non-stratified, always in

the process of formation and deformation, eluding fixed categories, transient nomad space-time that does not dissect the city into either segments and 'things' or structures and processes" (Smith, 2003:574). One approach that might potentially afford such openness and flexibility is actor-network theory (ANT). To examine this potential, this paper aims to apply the ANT methodological approach for analysing the urban development process in a post-socialist neighbourhood in Belgrade, Serbia. Based on Latour's argument in favour of a new research agenda on globalization and world cities, we will apply ANT not as a theory but as a method. This method emphasizes using human and non-human actors to examine how cities as specific socio-spatial phenomena are manifested through urban dynamics (Gad and Jensen, 2010) and thus produce a new complex reality of urban development. To begin, we will review the theoretical background of ANT and its application for urban research and analysis. We will then attempt to reinterpret the features of the post-socialist neighbourhood of Savamala according to the ANT framework and terminology. Finally, we will present the results and discuss risks of and opportunities for extending ANT beyond a merely descriptive framework towards operationalization in a specific urban setting.

2. Urban development research and ANT's contribution – literature review

2.1. A new conceptualization of urban development

In the early 21st century, the world has gradually reorganized economically, politically and socially through: profit maximization, the globalization of urban processes, the devastating history of deindustrialization (Harvey, 2012) and the dematerialization of the world. Urban development research techniques and methodologies should undoubtedly address these major shifts in urban life and contemporary cities (Healey, 1997).

Cities are no longer perceived as geographical entities with distinct identities. Rather, the urban today has become a concentration of multiple socio-spatial circuits, diverse cultural hybrids, sources of economic dynamism and a complex range of interrelated processes that form a coherent, albeit multifaceted time-space system (Graham, 1998). The city is perceived as a complex set where past, present and future converge; a dynamic entity that embodies the social narrative and the attempts to govern its social interactions and spatial distribution, i.e. urban development. In political terms, urban development is anything that happens to a city in terms of maintenance, transformation or any other change of its original state (Friedmann, 1987). In a context where physical spaces constantly intermingle with social constructions of these spaces (Firmino et al., 2008), the idea that a place is a single material object is annihilated and a place rather becomes a "space of flows" (Castells, 1998). The "city" concept thus shifts from a spatially bound, people-centred phenomenon to dynamic complex urban systems that, in their incompleteness and indeterminacy, are stages wherein urban elements participate in their production, adaptation and transformation. In other words, the city is perceived as a nexus that balances relational proximity in a fast-moving world with 'time-space extensibility', human actors and material objects being part of networks that extend beyond the immediate physical environment (Graham and Marvin, 2001).

Thus, we must shift the deterministic concept of urban processes to a more comprehensive vision that considers complex networks and their dynamic interfaces, in order to gain a better understanding of and strategies for urban development (Huang, 2012). Apart from representing a confusing mix of global and local influences, the complexity of such stand-alone artefacts is encumbered with layers of infrastructure that gradually interweave and infiltrate urban systems, life and culture in cities (Graham and Marvin, 2001; Portugali, 2011). The powers of such networking support a complex restructuring of urban elements combined with economic, political, cultural, technical and/or natural

factors (Murdoch, 1998). Such urban heterogeneity involves the operationalization, interrelatedness and interaction of socio-technical assemblies within a city (Graham and Marvin, 2001). The latter are extended over the times and spaces of urban life (Mitchell, 1996), and offer us an opportunity to construct dynamic, sophisticated, synthesised approaches to contemporary urban development. Consequently, cities nowadays are in a constant state of flux, with the rapid adjustment of their physical, economic, social and political structures (Sykola, 1999) to information flows and infrastructural scapes. As a result, the urban present is no longer attributed only to spatial forms, economic units and cultural formations but also to integral, complex socio-material and sociotechnical systems in cities (Farias and Bender, 2011).

2.2. ANT in the analysis of urban development

In recent urban studies, the complexity and dynamics of the networked urban system has been extensively reinterpreted through the prism of Latour's Actor-network theory (ANT), with all human, social and technical elements symmetrically treated within a system. All of these entities together contribute to dynamic, perpetual networking, where an understanding of phenomena (including social ones) lies in the associations between them[1] (Latour, 2005). In other words, it reflects the reproduction of the inherent complexity and incompleteness of urban development in three gradual stages: (A) labelling all active elements of an urban system, (B) identifying their roles, and (C) focusing on the associations among them (Table 1). ANT contributes by: (1) establishing a socio-material topology of urban networks, (2) navigating the interpretative dualism of urban theory (nature/society, local/global, action/structure), (3-3) elaborating the supremacy of the associations that configure the relational understanding of the city, (3-4) overcoming spatial hegemony in complex urban reality and above all (3-5) radicalizing the symmetry principle for human actions and non-human materials that makes it possible to determine the consistency and extensibility of urban phenomena beyond their spatio-temporal manifestation (Latour, 1993; Murdoch, 1998; Farias and Bender, 2011) (Table 1).

While human beings remain the key urban element, this blending establishes a new interpretation of cities as composite entities where all objects (physical spaces and structures, tools, technologies, data, formulae and regulations, institutions and, of course, humans) are mutually produced through enactment, interaction and translation (Farías and Bender, 2011). In Latour's (2005:71) words, "any thing that does modify a state of affairs by making a difference is an actor"; an actor is granted activity by others and can be the subject or object of an activity[2] (Latour, 1996). As such, the diverse range of associations and a symmetrical treatment of humans and non-humans help put action outside actors, whereby "[a]n 'actor'... is not the source of an action but the moving target of a vast array of entities swarming toward it," (Latour, 2005:46). The configuration of a relationship is what counts - not its nature, function or purpose. Networks are established when arrangements between actors produce stable patterns of performance and practices (Smith, 2003).

ANT methodology revisits key urban theory concepts in actor-network terminology (social order, scale, power, decision making, governance and urban development,[3] to name only a few). The broad range of applications for ANT in urban research and practice addresses

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[1] In Latour's view, what is important is association; in the interaction between two elements, both elements contribute, they are symmetrical. As Murdoch (1998:367) puts it "ANT came to this principle via two main observations: firstly, humans are not always actors, frequently they are intermediaries and, secondly, not all nonhumans are intermediaries, for they can often act in ways which change (human) worlds."

[2] The actual role does not matter in active-passive mode.

[3] From an ANT viewpoint, these concepts are consolidated and preserved by material objects that link actors across different spatialities and temporalities (Murdoch, 1998). Various authors validate the ANT approach in urban studies (Table 1).

Table 1
ANT in the urban realm – concepts, fields, date.

ANT ref	ANT stance	Urban field	Authors	Year
1-2, B; 2-2; X	Risk assessment as a way of associating: critical ANT approach; "de-composition" and reconstruction of key structuring forces and distinctive ways of associating.	Environmental justice	Holifield	2009
1-2, C; 2-4; 3-X	Identifying actors and looking at how they organize themselves; non-humans only as mediated forces/factors of importance.	Spatial planning; Urban regime theory	Boelens	2010
1-1, 2, B; 2-1; 3-X	Translation between humans and objects occurs when an object is designed or used. Types of intermediaries: texts, technical artefacts, human beings, money, etc.	GIS	Comber, Fisher, and Wadsworth	2003
1-2, C; 2-3(5); 3-XX	Process of building networks in social relations; Set of associations define and constitute spatial qualities.	Land/property redevelopment	Doak and Karadimitriou	2007
1-2, C; 2-4; 3-XXX	All research is partial and a product of associations (research bias) in a process of translation – network topology: Tracing associations between researchers, key informants and texts.	Human geography research	Ruming	2009
1-1,4, A; 2-3; –	Non-humans' role in architecture & building.	Architectural research	Fallan	2011
1-2, B; 2-3; 3-XX	The role of objects as mediators, causing the emergence of objects, groups and coalitions. Identify how controversies emerge from actors through associations.	Enclave urbanism	Wissink	2013
1-1, A; 2-1; 3-XX	Focus on materiality, on what is missing or obscured in housing studies that entangle humans and technologies; how non-humans intervene and disrupt the order of the city.	Housing studies (practice & policy)	Gabriel and Jacobs	2008
1-1, 3, A; 2-2; 3-XX	Exploring potentially obscured non-human actors; 'Follow the actor' analytic technique.	Housing regulatory framework	Cowan, Morgan, and Mcdermont	2009
1-1, 3, C; 2-5; 3-X	How the assemblage of artefacts supports the design process in sustainable planning and building. The tool (design tool) as a mediator and intermediary based on ANT; the fate of the tool is in the hands of those using it.	Sustainable cities & building practices	Georg	2015
1-1,3, C; 2-4-; 3-X	Mechanisms for object formation (reification, solidification, codification) and stabilization (objectification, naturalization, and institutionalization) in governance & planning identified through ANT.	Governance & planning	Duineveld, Van Assche, and Beunen	2013
1-3, C; 2-5; –	Criticizing the approach to global cities through structures, networks & actor networks. The hypothesis of assembled action through continuous association without any external power as an adequate context for localizing the global in current global-city research.	Global city research	Smith and Doel	2011
1-2, C; 2-2; 3-XXX	Visualizing networks through diagrams Global/local intermediaries.	Human geography	Marshall and Staeheli	2015

1 – ANT orientation in urban studies: (1) treatment of non-humans; (2) nature & process of networking; (3) reduction of dualities & general concepts to actors & networks;
A-B-C- ANT tenets for urban development: (A) labelling elements; (B) roles; (C) focusing on associations;
2 – Contribution of ANT: (1) non-humans & socio-material topology of urban networks: (1-1) targeting social order, (1-2) facilitating social relations, (1-3) serving as moral/political signposts; (1-4) presenting the social realm across space & time; (2) navigating interpretative dualisms by the sociology of translations; (3-3) exploring the supremacy of associations; (3-4) overcoming spatio-temporalities through actor-network interpretation; (3-5) establishing a symmetry principle of urban assemblages;
3 – ANT interpretations for urban decision making: (X) legitimacy of urban planning, (XX) controversy surrounding real estate transformations, (XXX) participatory urban transformations.

not only analytical views on theory and research (Boelens, 2010), but also planning methodologies, policy and practice recommendations, and development prospects (Healey, 2013). All these works adhere to basic ANT principles: (1) addressing material objects and representations through actor-networks; (2) reframing well-known dualities and concepts to in situ actors and networks, and; (3) networking nature and process in terms of associations and translations (Table 1).

Rooted in science and technology studies (STS), early applications dealt with human and non-human exchanges in mapping land cover projects, GIS that reconciled data with different ontologies and addressed "nodes, links and type of links" terminology of actor-networks (Comber et al., 2003). Architectural, housing and planning studies typically focus on materiality, artefacts and objects, and effective ANT application in this domain is: (1) to identify missing, obscured or invisible non-human actors in housing, market and policy practices (Gabriel and Jacobs, 2008), (2) as an interpretative tool for processes and mechanisms under review in order to distinguish active mediators and passive intermediaries (Cowan et al., 2009), (3) as a theory of action for interpreting complex associations of people and objects in architecture (Fallan, 2011), (4) to demystify the complexity of stabilizing/destabilizing object enactment mechanisms as a way of

revisiting the role of 'planning', 'implementation' and 'design' in the governance and planning process (Duineveld et al., 2013), and (5) to assess the relational aspect of assemblages as a way of explaining the influence of innovative tools for spreading explicit and tacit knowledge for the planning and building of sustainable cities (Georg, 2015) (Table 1).

Furthermore, the network-related ANT framework had been stretched from analytical research tendencies to urban practices. On one hand, Doak and Karadimitriou use Callon's four phases in actor-network translations[4] (Callon, 1986) to map complex redevelopment processes that have been reduced to mere associations of social relations and material objects stabilized by intermediaries (Doak and Karadimitriou, 2007). Holifield, however, advocates Latour's (1996) version and a political usefulness of ANT suggest using intermediary/mediators role of risk assessment changes as a tool for "tracing the (contested) assembling without taking the existence of social relations—like capitalism and class—for granted" (2009:647). Boelens (2010) takes a similar stance by advocating a relational view of spatial

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[4] The stages of the network building process are: problematization, interestment, enrolment, mobilization (Callon, 1986).

planning and its interaction with the urban behaviour, using ANT to identify actors and see how they organize from the ground up—not through objectives, visions or plans. Recently, ANT has received attention as part of a wider, poststructuralist approach to cities[5] (Smith, 2013), further emphasizing its role in the production and acceptance of associations in terms of evaluating the position of a researcher and their agency in human geography (Ruming, 2009), and reflecting the process of their production and acceptance in urban enclaves (Wissink, 2013).

Although this post-structuralist ANT tenet is based mainly on a flattened, network-oriented interpretation of system dynamics, recent arguments support recognizing the heterogeneous role of material objects. Tracing non-human elements from Latour to Foucault, it is clear that material objects are anything but passive and play different social roles such as: (2-1) reflecting and maintaining social order, (2-2) facilitating social relations, (2-3) serving as moral/political signposts, and (2-4) acting as social intermediaries across space and time (Sayes, 2014; Van Assche and Verschraegen, 2008) (Table 1). Henceforth, non-human agents become intermediaries/mediators and actors; their active engagement in urban development reflects different levels of urban decision-making ((X) upholding the legitimacy of urban planning, (XX) underpinning the multiple realities of real-estate interest, and (XXX) personalizing participatory urban transformations through actor-network perspective (Latour, 1996; Rydin, 2010; Van Assche and Verschraegen, 2008)) (Table 1).

ANT seemingly continues to provide a conceptual framework for interpreting and guiding different ways of analysing networks. It is also coherent as "a pragmatic approach to study actual practice in concrete sites and situations" (Farías and Mützel, 2015:526), focusing on description of performativity of the black-boxed social world through: (1) the active role of non-humans, (2) the sociology of translations (3) free associations, (4) inseparable actor-networks, and (5) urban assemblages (Latour, 1996). The concept of assemblages is useful for capturing the complex relationality of dynamic urban systems, though it fails to go beyond merely following actors to examine human-human and human-nonhuman interactions (Cowan et al., 2009) or facilitating understanding of their normative and transformative nature (Gabriel and Jacobs, 2008).

The rudimentary yet hyper-dynamic conditions of transitional societies offer insight on how urban development norms, projections and structures unfold from within the network and on how associations and translations of basic elements are formed and developed. In Serbia, the urban planning framework withstands a complex, elaborate institutional legacy yet having rather a symbolic meaning (Nedović-Budić, 2001). Fragmented, uncontrolled spatial transformations are governed by different, often illegitimate interests (Petrovic, 2009), as active but powerless urban actors struggle to develop flexible social patterns and networks (Cvetinovic et al., 2013). The case study of a post-socialist neighbourhood in the capital of Serbia is thus a good way to observe the relationship between top-down urban planning, interest-based urban transformations and bottom-up urban design. Moreover, few methodological research studies have examined the modalities of urban development in transition, with the exception of the replicated approaches of neo-liberal or institutional economies (Tsenkova, 2007). In this respect, we aim to examine the utility of ANT analysis for understanding the developmental reality of Savamala neighbourhood in Belgrade.

3. Methodology (2p)

Based on our interpretation, ANT is addressed here neither as a network in the technical sense, nor a theory in social sense (Latour, 1996), but as a methodological approach that prioritizes "relations over

[5] Deleuze (poststructuralism), DeLanda (assemblage theory), Serres (topology), and Badiou (event).

their characteristics" (Cerulo, 2009:536) and "action over mind," (Cerulo, 2009:543). We will explore these relational and operational elements that mould urban development conditions in Savamala. We will focus on an actual post-socialist urban setting where the maintenance, transformations and/or changes take place when global aspects are adapted to meet local specifications and vice versa. In terms of post-socialist cities, simply copying Western urban models is quite difficult as these cities lack the institutional infrastructure and cultural patterns essential for creating the functional unity found in Western cities (Petrovic, 2009). Furthermore, the type of fundamentality and intensity of economic and political change in Balkan post-socialist countries is hard to find in a "typical" capitalist city (Sykora, 1999).

In Savamala we were confronted with a dynamic reality, a battlefield of different influences, interests and interpretations that determine the future of the urban system itself. In our research project we use qualitative data collection, overlapping our case study with interpretative and participatory action research. These methods provided the data for the ANT analysis reinforced with correlational study, while an engineering approach of logical argumentation and schematic interpretation were used to disseminate the data. The main data sources (human and non-human based) were collected using different collection methods, including (1) an extensive review of written sources, (2) interviews, (3) workshops, and (4) questionnaires, provided by key informants, including (A) experts, (B) young professionals, (C) participatory activities, and (D) the Belgrade Waterfront Project (Table 2). These key informant categories were identified from the aggregated human and non-human bearers of action and meaning (Latour, 2005) among the relevant influences, interests and interpretations in Savamala.

In terms of data analysis, a diagnostic of urban development conditions was established by transposing the neighbourhood's current state into elements that might denote urban flux. These elements, when combined into functional networks, form a unique set that indicates factors of maintenance/transformation of and/or changes in the system, what is, in our case, the neighbourhood of Savamala. The successful application of ANT involves transposing ANT terminology into urban development factors and an exploratory analysis for identifying these factors in a real-life context. In order to apply its theoretical principles for on-site analysis of a dynamic urban reality at the neighbourhood level, we propose to reformulate them using the following step-by step methodology: (1) identifying *human/non-human entities*; (2) flat reality of *intermediaries'* figurations and translations between *mediators*; (3) tracing *associations* among those established as actors; (4) tracking *stability/instability* of agency among actors; and (5) simplifying and functionalizing relationships in *urban assemblages* based on the established roles and nature of the links among them (Table 3). As a part of a broader study on the post-socialist urban development model, we will examine actor-networks in Savamala rendered from a composition of different layers of decision making that, through coordination and predominance, reflect urban dynamics. The level of analysis is the neighbourhood.

Central methodological issues for translating ANT terminology in an urban environment indicate:

1. *All human and non-human actors:* From an ANT viewpoint, the origin of an action accounts equally for humans and non-humans, where only action/relation counts (Latour, 1996). Animals, objects, texts, symbols, events and concepts may be actors depending on their activities and/or relationships (Cerulo, 2009).
   In our case study analysis, we distinguish the figuration of all human and non-human entities that have been translated at the Savamala neighbourhood level. Our argument is grounded in the local context of planning procedures and practices with regard to the Serbian urban system and at the post-socialist neighbourhood level, as well as bottom-up activities in Savamala. In this way, we ponder the

Table 2
Data sources and data collection methods.

		A	B	C	D	Key informants type
		Experts	**Young professionals**	**Participatory activities in Savamala (PAR)**	**Belgrade Waterfront Project (BWP)**	
1	*extensive review of written sources*	+ literature on post-socialist and Belgrade context + legal and planning documents	+ PhD workshop results	+ operational documents, + media coverage (UI, City Guerilla)	+ media coverage; + legal & operational documents	Non-human
2	*interviews*	+		+		Human
3	*workshops*	+ post-socialist urban planning & Savamala	+ Student workshop	+ round tables		Human
4	*questionnaires*	+	+			Human
	Methods of data collection	**Key informants**				**Data sources**

complexity of our case study neighbourhood comprised of human (urban actors and stakeholders) and non-human entities (urban structures/territories, natural/urban spaces), institutions, policy agendas, urban/communication infrastructures (Mitchell, 1999; Firmino et al., 2008) and social aspects (economic, political and cultural) (Table 3). These operational categories of key urban agents are traced through extensive content analysis within the theoretical scope of urban studies. All case-specific entities are identified within the content analysis of various sources on urban decision making in Savamala (post-socialist urban theory, planning legislation and documentation, media sources) and from on-site examinations.

2. *Intermediaries and mediators:* Following Latour's definition (2005), these human and non-human entities become "means to produce the social" (Latour, 2005:38) only when their role in the system enacts them as intermediaries or mediators (Latour, 1993). In his words, intermediaries are simply bearers of meaning,[6] whereas mediators actually change the actions/relationships they are involved in.[7]

Based on a content analysis of research as well as legislative, operational and media data, we were able to recognize that only through certain figurations in networks were certain elements able to take on an actor role (Table 3). We distinguish four element-types: entity, human, artefact and event. For example, all four have varying degrees of importance depending on whether they are considered individually or as a set/group. For artefacts it is crucial to consider if they are of the strategic, technical or repository type. Visually, the shape of the nodes depends on what figuration of an element makes it an actor.

3. *Free associations:* One of ANT's mayor achievements is its attempt to redefine sociology as a tracing of associations, thereby considering "social" not only as a feature of an element/entity but "a type of connection between things that are not themselves social," (Latour, 2005:5).

The aforementioned key urban actors (urban actors, spatial forms, regulatory frameworks and social aspects), in addition to being mediators, also have an active role in networks. In ANT terminology, this is referred to as the performance of subject (human entities) and the enactment of objects (non-human) (Farias, 2011; Callon, 1986). As part of the ANT data analysis, we juxtapose the

entities and convert them into actors, which associate and form networks (Table 3). The reinterpretation of classic categories of scale, structure and the social in network terms is based on a qualitative inquiry among local experts (Table 2). These categories are not taken for granted but applied rather only when they influence actors' relationality.

4. *Stabilizing and destabilizing agencies:* When applying ANT for urban analysis, it is important to avoid pre-established social science categories (Farias, 2011). It is essential to refer to agency as a relationship that connects multiple actors and distributes causality/ explanations across networks in a stabilizing or destabilizing way (Farias, 2011).

Based on expert insights, data from a PhD workshop and documentation on the local, regional and national levels, we examine the complexities and interactions among actors at the neighbourhood level (i.e. how they cooperate, coordinate, negotiate, clash and organize into networks according to their role (Table 3)). In graphical terms, node colours correspond to actors' agency and the active but standardized networks they are part of. The difference between association and agency in our interpretation lies in the dynamics; these two types of networks, though standardized, have the bipolar ability to influence actor-networking.

5. *Urban assemblages:* Urban assemblage is a popular term for aggregating, though not altering the identity of, relationships between heterogeneous urban actors (Muniesa et al., 2007), or for "relations of exteriority" based on actor-networks (Farias, 2011:15).

Based on social and structural ANT descriptions of urban dynamics, data validated in workshops with researchers, professionals, activists, young professionals and citizens were channelled visually through the actor-network diagram. Actor networks were taken without any preconceptions of society, the social realm, social context and/or social ties, and then visualized by node size (actors) and the colour of links between them (networks) (Table 3). The size of the node is equivalent to the centrality of an actor and its influence. Actors' influence was roughly assigned based on their activity over time, the number and types of relationships. Conversely, the colour of the links concerns their nature and the specific social effects they produce.

This 5-step ANT framework aims to illustrate the urban development of Savamala, a post-socialist neighbourhood in Belgrade. To establish logical argumentation regarding network formation and

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[6] We can even say they can be omitted or considered "black boxes" in the analysis as long as they do not have any other figuration (Latour, 2005).

[7] Sensory input + mediator specificity = action output.

Table 3
ANT analysis of data.

	ANT elements: concepts	Process of analysis	Results – urban analysis: contents			Operational definition	Data sources *(Table 2)*
			Urban interpretation	Urban elements			
1	**All human & non-human entities**	identify	Urban key actors	Urban actors & stakeholders		Human urban actors	post-socialist urban theory literature, planning legislation and documentation, media sources *(1-A)*
				Territory	natural	Spatial forms	
					urban		
				Built environment			
				Institutional relations		Regulatory framework	
				Policy agendas			
				Urban infrastructure		Technical & technological entities	
				ICT			
				Political		Social aspects	+ Media coverage *(1-A-B-C-D)*
				Economic			
				Cultural			
			Levels of decision making	Top-down urban planning		Shape of nodes	Documentation & Media *(1-A-C-D)*
				Real estate transformations			
				Bottom-up participatory & design activities			
2	**Intermediaries & mediators**	Figuration of human & non-human entities	Nature of actors	Entity		Colour of circle lines	Documentation & Media *(1-A-C-D)* Student workshop *(3-B)*
				Human			
				Artefact			
				Event			
3	**Free associations**	Convert into actors	Network of influence	Scale		Field colour	Expert questionnaire/ workshop/interviews *(2-3-4-A)* Documentation (local, regional, national) *(1-A-C-D)*
			social categories	Structure		Field colour	
			social artefacts	The social		Colour of nodes (stroke)	
4	**Stabilizing & destabilizing agencies**	Stabilize	secondary networks	Urban supporting systems		Colour of nodes (fill)	Expert /Participatory workshop/interviews *(2-3-A-C)* PhD workshop *(1-B)* Legal & Operational Documents *(1-A)*
		organize	Agency networks	Urban function		Size of nodes	
5	**Urban assemblages distribution of actor-networks**	Simplify	centrality of an actor	Actors' presence in networks, decided from: (1) its presence in time, (2) number of relations, (3) types of relations		Colour of connecting lines	Expert workshop, Student workshop, interviews, round tables *(3-A-B-C)* Questionnaires *(4-A-B)*
		functionalize	Nature of links	notion of performance/ enactment			

Interpretation of how ANT methodology overlaps with concepts from urban practice and research, and serves as a background for a case study analysis of a post-socialist neighbourhood in Belgrade, Serbia.
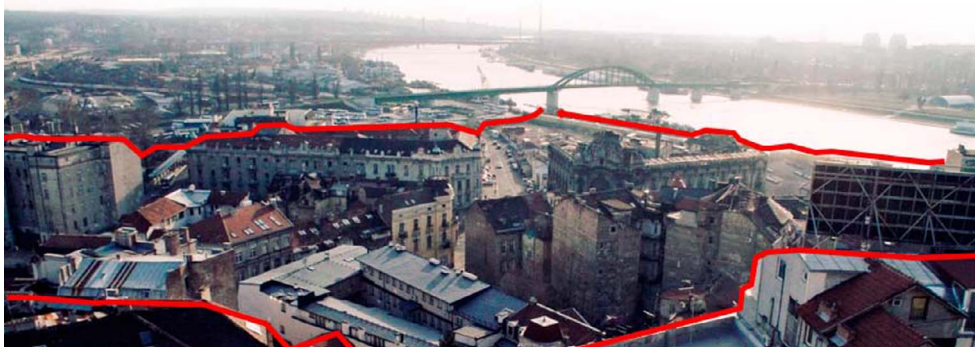

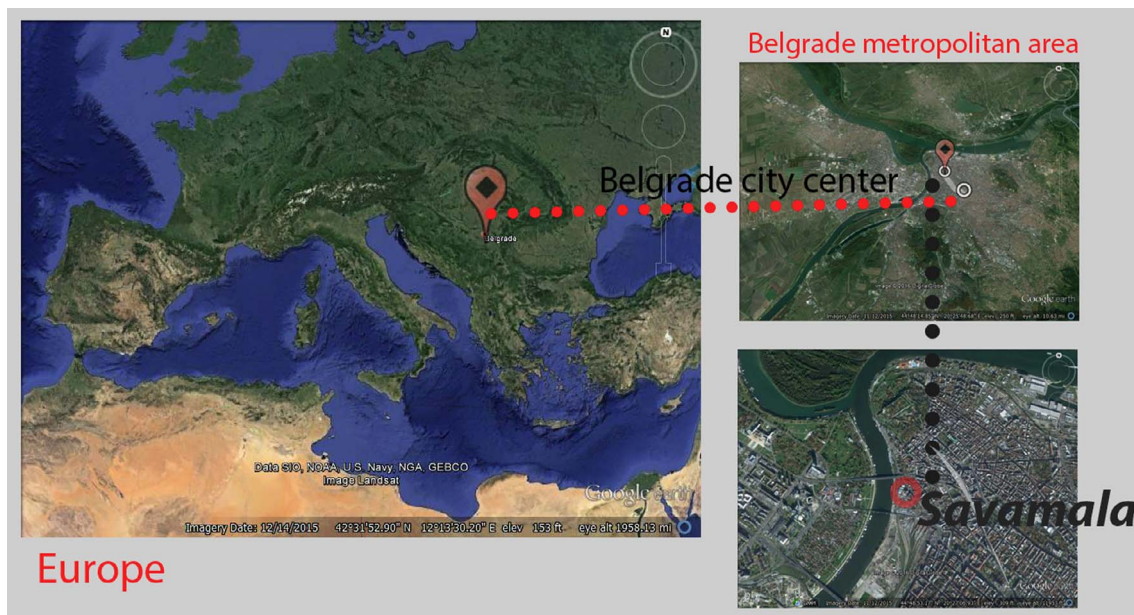**Fig. 1.** Savamala boundaries (unofficial but generally accepted).

Fig. 2. Savamala neighbourhood in a geographical context: Europe - Belgrade (maps).

development, we accepted the key ANT assumptions that: (1) everything of importance is an actor and therefore part of a network(s) and (2) there is no context or any other non-associated element in a system. In this respect, we can visualize Savamala's urban development circumstances (all context-, history-, on-site and documentation-related data) in terms of actors (human and non-human) and the nature of the links they have relative to their activities, priorities and relationships.

4. Savamala case study

Bearing in mind that actor-network explanations only provide reliable results in well-defined situations (Farías and Bender, 2011), we applied a flattening composition for all heterogeneous human/non-human actors (ANT) in Savamala, identified from the qualitative data collected at five different levels (Table 3) to visually describe the urban reality of a post-socialist neighbourhood.

The Savamala neighbourhood in Belgrade is situated on the southern bank of the Sava River in old Belgrade (Fig. 2). Savamala is more of a place on the mental map of Belgrade, home to some of the city's important landmarks, than an official administrative unit (Fig. 1). Its name means "Sava neighbourhood", derived from the Turkish word *mahala* (meaning neighbourhood) and the name of the river whose bank it is situated on. The first official mention of Savamala was roughly 200 years ago, after the city authorities' resolution to extend urban structures to the river in order to promote its urban development. Rich in tradition, history and heritage, Savamala combines traditional and modern, past and present. Physically, Savamala can be described as an appealing location in the almost geometrical centre of Belgrade, within walking distance of the city centre yet removed from the ever-growing hustle and bustle. It is an attractive but deteriorating neighbourhood with potential for renovation and refurbishments. In a nutshell, it is a scaled-down example of the pre-socialist material legacy, socialist cultural and societal matric, a transitional reality and a condensed case of its multi-faceted circumstances of post-socialist urban development (Table 4):

- *The pre-socialist past* evident in Savamala's *architectural and cultural heritage*[8] (Fig. 3).

- *Cultural and behavioural patterns* from Yugoslavian socialist regime[9].
- *Post-socialist backtracking*[10] through the inherited urban practices from socialism
- *Transition prospects*[11] based on the recently established neoliberal economic constellation and Savamala's potential to become an attractive urban area for investments.

Following the context highlighted by the in-depth case study research design, an actor-network map was illustrated in node-link form. The visualization of the empirical and theoretical data regarding the actors and networks was structured in the following way:

1. *All human and non-human actors – case study description:*
   In ANT terms, the Savamala neighbourhood is a venue (natural or urban territory/space) with material constitutional elements (built environment, urban structures, etc.), wherein a variety of urban actors and stakeholders (individuals and groups) – linked by these social factors and within a specific regulatory framework (policy agendas and institutional relationships) – partake in actions. As we have argued, rapid flows of people and information in a modern, globalised world have profoundly changed our perception of space,

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(footnote continued)
Savamala was built by the most famous national architects of the time, and most of their masterpieces still exist. Some examples include Geozavod (Stevanovic and Nestorovic), The Bristol Hotel (Nestorovic), Luka Celovic's home (Savcic) and Vuco's house (Leko). However, during the socialist regime, Savamala was disregarded as a legacy of the pre-WWII capitalist era.

[9] These patterns may be summarized in the following way: (1) a mainly middle class society, (2) suspicion, lethargy and lack of understanding as regards social participation, (3) a top-down approach to spatial/social development, (4) restricted, nominally predefined and ideologically-framed civil rights (Cvetinović and Veselinović, 2014).

[10] Speaking primarily of the present, but in reference to the past and the characteristics of socialism, which are slowly fading, but have left their mark, including: (1) political supremacy over urban development; (2) corrupt public authorities that control spaces in Savamala; (3) leasing of lands to private investors without transparent bidding procedures beforehand.

[11] Transition more in terms of what the future will bring and opening up possibilities for private capital to enter the privatization/real estate acquisition process. In fact this means marking the processes of its change towards: (1) citizen participation in bottom-up activities; (2) dominance of private ownership (Belgrade Waterfront Company, Mikser, KC Grad); (3) powerful private developers aiming to maximize profits by usurping public spaces and built infrastructure; (4) material and social segregation of the Waterfront and Upper Savamala and their users.

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[8] Serbian rulers persistently attempted to fight substandard conditions in the neighbourhood and develop a commercial/crafts town quartier and administrative centre.

Table 4
Savamala space–time translation into ANT.

Space	Time			
Location & Space	**Pre-socialist:**	**Socialist**	**Post-socialist**	**Transitional:**
kept its initial triangular shape on the right bank of Sava River from its early years when it was a village outside the walls of Turkish city	the period after the liberation of Belgrade from Ottomans and before WWII	40 years of socialism after WWII	the period after the dismantlement of Yugoslavia in 1990s	late 1990s and after the political shift in 2000
Proximity of city centre	amorphous urban form		lack of data on social structure	Market led economy
Sava Amphitheatre	trade & artisanal area	state control over capital areas & infrastructure		Dominance of private ownership (Belgrade Waterfront Company, Mikser, KC Grad)
		public ownership of land and building stock		commodification
Transit area		noise & pollution		vivid night life
Devastated & deteriorating area	cultural heritage	disintegration of tradition & heritage	deteriorating industrial area & abandoned buildings- corrupted public authorities dispose of spaces in Savamala	
	recognizable cultural identity		leasehold of empty plots to the private investor without transparent bidding procedures	Creative cluster & citizen participation
	architectural heritage		fragmented approach to renovation/revitalization	
proximity of bus & train terminal	richness of tradition (crafts)	marginalized groups living in the area	political supremacy over urban development;	Unsafe /safe
			hybrid market circumstances - powerful private developers aiming to maximize their profit by usurping public spaces and built infrastructure	
proximity of the river	Bourgeois neighbourhood	Middle-class society	petty crimes	democratic political system
		suspicion, lethargy and lack of understanding toward social participation		
Neglected spatial capital	restricted, nominally predefined and ideologically-framed civil rights			
Spatial fragmentation	top-down approach to spatial and social development		lack of data on physical environment	clear class division - material and social segregation of Waterfront and Upper Savamala and their users.
architectural heritage		Disregard of bourgeois architectural & cultural heritage	fragmented approach to renovation/revitalization of urban/architectural heritage	

time, lifestyles, community and self (Ellin, 1999). The vital, cohesive force of the modern city incorporates also technical solutions (urban infrastructures) and technologies (communication and media). Social components (political, economic and cultural aspects) are considered comprehensively as contextual, post-socialist or transitional aspects spanning these different space-time layers. Likewise bearers of non-human agency, they are a component of urban assemblage networks and active elements linking urban actor-networks, spatial/temporal layers and layers of decision making with urban development prospects. The morphology of urban decision making holds sway over urban complexity, as it embodies the relationality of urban elements and reveals the origins of urban agency. In this respect, the initial identification of human and non-human actors is summarized as part of a top-down urban planning structure, interest-based transformations and bottom-up participatory/urban design activities in the urban realm of Savamala.

- Top-down urban planning actors – institutions and policy agendas Institutional organization of the urban regulatory framework in Serbia corresponds to the Republic's administrative organization.[12] The Ministry of Construction, Urbanism and Infrastructure

is the key public actor at the national level in a sector that: (1) conducts administration tasks, (2) governs strategic construction, site-development and infrastructure works, (3) does surveying, and (4) inspects and supervises actions in the field (Maksic, 2012). Conversely, cities and municipalities have the legal means and right to develop their own strategies, plans, and programs, as well as local regulations as regards urban development.[13]

National and city authorities, planning bodies and policy agendas are under constant pressure to solve the old issue of Belgrade's peak waterfront area. These initiatives date back to 1920s.[14] The

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[12] The administrative organization of the Republic of Serbia consists of: 23 city districts, 150 municipalities and the city of Belgrade, which has a special status. These entities act as political bodies but are not authorized to make their own decisions regarding spatial development.

[13] Local authorities initiate and adopt planning documents that control urban development and set guidelines for the administration of their respective territories.

[14] The 1923 GUP announced the relocation of the railway station. The Sava subway project was included in the 1972 GUP. In the late 80s, authorities promoted the "Town on the water" project. The infamous Serbian leader Slobodan Milosevic supported the CIP Europolis project as a part of electoral campaign in 1995. In 2011, an international

Fig. 3. Geozavod - architectural heritage in Savamala.

exact area of intervention of these planning phases varies from Gazela Bridge to beyond Dorcol marina. However, their common denominator is the relocation of bus and railway station.

- Interest-based transformations – influential business stakeholders and corporate bodies

  Powerful investors use their economic and political dominance to buy highly valuable waterfront real estate in the Serbian capital for cheap and development it to serve their future needs. The largest ones thus far in the greater Savamala area are:
  - Lamda Development investment (for the Beko factory renovation[15]);
  - The "City on water" project by Luka Belgrade[16];
  - Eagle Hills and Belgrade Waterfront Project (BWP).[17]

- Bottom-up participatory and urban design activities – Artists and cultural workers, national and international cultural institutions and NGOs (Fig. 4)

  Having considered the transitional capital of Savamala in the local context, from 2008 onward a number of small-scale public initiatives and creative services have succeeded in finding their place in neighborhood (Cvetinovic et al., 2013).[18] Given the lack

of an overall urban development strategy, independent cultural entrepreneurs,[19] supported by the Savski Venac municipality, have started turning defunct warehouses and craft shops into spaces open for public participation and social production.[20] These associations and private initiatives have created an alternative strategic path for influencing the neighbourhood's development ("Mikser Festival" 2012) and forging its reputation on a global scale as a creative cluster in a European metropolis.

The agency and relationships of the abovementioned human and non-human actors in Savamala are plotted by association at different layers of decision making (top-down urban planning, interest-based transformations and bottom-up participatory/urban design activities).

2. *Intermediaries and mediators*

The process of associating agency with human and non-human actors without allowing social forces to imbue it with meaning is constantly threatened by the tendency to oversimplify uncertainty and controversy regarding who and what is the true source of action (Latour, 2005). Based on the empirical data, the crucial distinction between individual, documentary or event sources of action actually determines local or de-localized[21] nature of interventions in Savamala. In this respect, we differentiate human, entity, artefact and event figurations and indicate whether it is an individual or group element. In a certain respect, the nature of an element determines whether or not it bears or changes[22] (Fig. 5). What is more, it is also

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(*footnote continued*)

competitive bid for the area's architectural design was announced; the winner was Japanese architect Sou Fujimoto. In 2013, an investor from the UAE bought the National Shipping Company and all its land, laying the groundwork for an array of legislation and planning document changes to accommodate his interests within the "Belgrade Waterfront Project".

[15] Land was sold in 2007. In 2009 the amendment to the City Regulation plan, which conformed to the interests of the investor (who was financing the drafting of the Plan in a double role of planmaker and, later, LD employee) was officially established. Zaha Hadid signed Beko masterplan in 2012.

[16] The overall urban design was developed in cooperation with Daniel Libeskind and Jan Gehl during the 2008–2010 period. The plan provided for the renovation of the Dorcol Marina and its surrounding area.

[17] First announced in 2012, it gained publicity before the national elections in March 2014 as a strategic partnership between the Serbian government and an investor from the UAE. The initial value of the project was advertised as being 2.5 billion euros. By the time the official contract was made public in the summer of 2015, the value had shrunk to 300 million euros, with nearly half of the sum obtained from a loan shouldered by the citizens of Serbia. Major criticism of the project included: (1) the complete lack of transparency; (2) the exclusion of the profession at the national level of decision making; (3) overcrowding and the vast amount of space needed; (4) the land given to the investor to build whatever he wants however he wants; (5) wasting geometrical centre of Belgrade and its waterfront area for housing and commerce with less than 1% for cultural facilities; (6) conflict with the GUP; (7) parking space could not be underground following the tenure examination; (8) cultural urban planning - what suits the UAE does not necessarily correspond to the Serbian context (Zekovic et al., 2016).

[18] An intensive aggregation of participatory activities started when the Mikser Festival settled in the neighbourhood, although Savamala had known similar activities, though smaller in scope. The Festival continues to be a rather spontaneous participatory event that changes Savamala's immediate surroundings.

[19] For example: KC Grad – an independent cultural centre; Magacin – an NGO culture cluster; Mikser House – a creative association and successor of the Mikser Festival, an art and culture event which settled in Savamala in 2012 after being held in Zitomlin for two years; Nova Iskra – privately owned young designers incubator; and "Urban Incubator" – a Goethe Institute initiative.

[20] "Urban Incubator" (UI) – a Goethe Institute initiative – stands out as a strategic gateway for influencing the urban development of this devastated but promising neighbourhood. The cluster of 10 site-specific projects targeted urban design and renewal, art and culture in Savamala for a one year period (2012–2013). The project revived 5 physical locations in the neighbourhood and created new local/international networks around its symbolic capital (Kamenzind, 2013). By the time UI ended, most of the projects found local counterparts and continued on in this new form.

[21] In Latour's terms, de-localization does not serve to de-spatialize the action, but to indicate that it is been disconnected and re-connected to some other place, namely globalized under certain circumstances (Latour, 2005).

[22] For example, an event may be influential only as part of a series of events and is

Fig. 4. Street art in Savamala: the symbol of Savamala.

a way to place what may, under other circumstances, be deemed uncertain, controversial or social in general, into networks.

The distribution of roles within the Serbian regulatory framework is highly dependent on the individual/group human actors who are assigned certain position in decision making (Questionnaire 1). Namely, the institutional structure is more often than not encumbered by the triple representation of functions for certain positions {for example, the Prime Minister (Questionnaire 1, Interview 1)}:

(1) the official administrative scope of the institutional role assigned to an individual,
(2) the symbolic significance assigned to the role based on the historical dominance of the individual approach versus the institutional one,
(3) the individual human agency of the person who holds the position.

3. *Free associations*

Based on our qualitative data (Table 3), we found that classic urban categories (social, structure and scale) cannot be fully undermined, although they were not used in an explanatory way but rather as associations of performativity and enactment (networks of influence and social function categories) (Fig. 5). This association-based deconstruction of actors' roles instead reveals internal networking versus external one. Namely, the structure and scale internalized in the social manifestation of the actors analysed offer a possible perspective on how they engage in networks and form certain social constellations (urban development prospects).

In terms of networks of influence, some confusion remains in the local context due to constant shifts in authority, from "top-down" to "ground-up" as a result of the hierarchy of the regulatory framework (Interview 2). Given a lack of transparency and the knowledge of the legal workings, citizens, stakeholders and investors usually resort to individual sources of authority in public institutions. On the contrary, in the historical overview of real estate transformations after 2000, the influence of international corporate actors and investors is undeniable (Beko Factory, BWP).

4. *Stabilizing and destabilizing agencies*

We identified actors according to their social function/action through participatory action research methods (Table 3), elaborating that these agencies and bring an additional layer of urban reality explanations (Fig. 5). It was also discovered that the various social manifestations of these actors have a double effect. In fact, differentiating functional and supportive networks indicates that the actors may change their role by changing their network engagement. Therefore, they can work both stabilizing and (de) stabilizing (practice-based urban research[23] or public utility companies in planning[24]). The notion of supportive/secondary networks, however, is presented as a major subset of actors already existing in any socially functional network, which explains their bipolar nature.[25]

5. *Urban assemblages*

Having illustrated Savamala's urban environment through its actors, their figuration and agency, we will now interpret the complexity and dynamics of its urban development through node-links. Considering the post-socialist context, significant pressure from private investors and links between civic initiatives and participation in Savamala, we have identified a network of translations that reflect different layers of decision making. These translations consider actors' centrality and the nature of the links between them, and in this way represent an "assemblage" process of agency dissemination (Fig. 5).

As a result, the full array of urban assemblage networks in Savamala reveals different orders of things/actors (Tables 5 and 6). From Latour's perspective on how the social may be reassembled there is a certain redistribution of decision making layers in the case in question (Latour, 2005):

- "localize the global" (governance)

  The main agents of the contextual transition (neoliberal market, democratization of the social realm) in Savamala do not originate locally; rather, they come either from powerful international

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[23] Circumscribed bottom-up actors in Savamala (alternative culture, artists, social organizations, service-oriented entrepreneurs, and local residents) kept the relationality of space and action incorporated in their actor's nature. While their relationship to space was common interest in a scarce resource, the organizational binds (formal and informal organizations) limited the actual participatory nature of their agency. The framework of bottom-up action that was initially announced was actually imposed from the top down by the international actors and local action distributors.

[24] One example is the importance of public companies and public utility companies for local planning, namely with regard to their physical and practical constraints on spatial interventions and building. The key question is their link in local networks and the discrepancy between the actual and official role they place in the urban planning and implementation cycles.

[25] For example, NGOs refers to a wider category of formal/informal organizations, but as a coherent set of non-governmental entities with different roles in the local context, i.e.in participatory activities in Savamala.

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taken only in this form. The same may be said for humans and artefacts.

NATURE OF NETWORKS

STRUCTURE NETWORKS

- MANAGERIAL
- REGULATORY
- VERIFICATION
- CONSULTING
- RESEARCH
- EDUCATION
- PLANNING
- IMPLEMENTATION
- ADMINISTRATION
- CONTROL
- SECURITY
- FINANCIAL

SUPPORTIVE SECONDARY NETWORKS

- URBAN RELATED
- DATABASES
- INFRASTRUCTURE
- TRANSPORT
- SERVICE
- BUILT ARTIFACTS
- NGO

SOCIALLY FUNCTIONAL NETWORKS

- PUBLIC - PRIVATE ENTERPRISES
- PUBLIC INSTITUTIONS
- PUBLIC UTILITY COMPANIES
- URBAN AUTORITIES
- PUBLIC ENTERPRISES
- POLITY
- PRIVATE ENTERPRISES
- FORMAL & INFORMAL ORGANIZATIONS

SOCIAL ARTIFACTS

- ECONOMIC ARTIFACTS
- POLITICAL ARTIFACTS
- CULTURAL ARTIFACTS

NATURE OF ACTORS

- PRIMARY FUNCTION
- SECONDARY FUNCTION
- SIZE: INDICATES EXPOSURE

INDIVIDUAL

- ○ ENTITY / INSTITUTION
- ▷ BUILDING / PUBLIC SPACE
- ◇ DOCUMENT / ARTIFACT
- ❯ TECHNICAL DOCUMENT
- ◉ EVENT / PROJECT
- ⚇ INDIVIDUAL HUMAN FACTOR

SETS

- ⬭⬭⬭ SET OF ENTITIES
- ▷▷▷ SET OF SPACES
- ◇◇◇ SET OF DOCUMENTS
- ❯❯❯ SET OF TECH. DOCUMENTS
- ◉ SET OF EVENTS
- 𝍢𝍢𝍢 GROUP HUMAN FACTOR

HIERARCHIES

- ◎ SET OF HIERARCHICAL ENTITIES
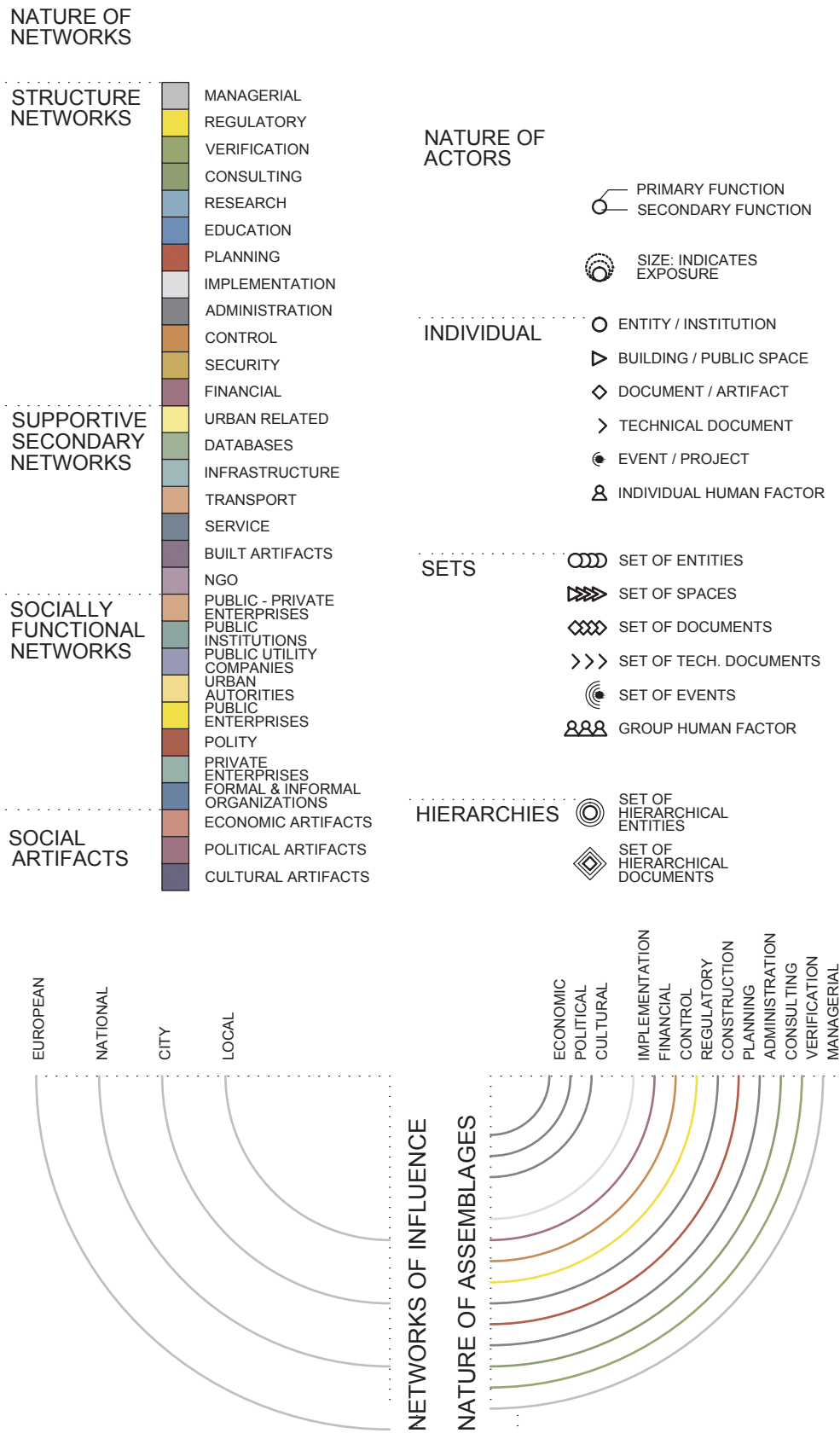- ◈ SET OF HIERARCHICAL DOCUMENTS

Fig. 5. 5 dimensions of actor-networks.

Table 5
Involvement of urban key agents in the social aspect of assemblage networks.

			Decision making level		
			top down UP	real estate UT	bottom-up PDA
		Human urban actors	individuals in institutions Private investors Political parties Scientific & Professional organisations, Research institutions, Universities	Private investors Political parties GeoZavod, Savanova cafe	Research institutions, Universities, Mikser, KC grad, City guerilla, "Ne(da)vimo Beograd", School of Urban Practices
urban key agent actor-network	regulatory framework	Space	Waterfront	Waterfront	Upper Savamala
		public administration	▼ 1, 2, 5, 6, 7 ■ 10, 14 ● 20, 22 — Municipality Savski Venac City Authorities Prime Minister, National Government, Parliament, City Mayor, City Architect	▼ 7 ■ 10, 11, 13 ● 19	● 17, 21, 22
		urban planning authorities	▼ 1, 2, 5, 6, 7 ■ 9, 12 ● 20 — Ministry of Construction, Urbanism & Planning, Belgrade Land Development Agency, Catastre, NARR, Urban Planning institute, Planning commission, Secretariat for Urban Planning & Construction	▼ 7 ■ 13, 16	● 21
		policy agendas	▼ 1, 8 ■ 9, 12, 14 — National sustainable development strategy RS 2008; Spatial development strategy RS 2009 2013 2011; Regional development strategy "City of Belgrade Development Strategy"	▼ 8 ■ 10, 11, 13, 15	● 17
		legal framework	▼ 5, 6, 7 ■ 9, 10, 11, 12, 14 ● 20, 22 — Law on Planning & Construction RS 2014; Lex specialis2015; Law on Land Conversion RS 2015; Law on Leasehold of public urban land	▼ 7 ■ 10, 11, 13, 15	● 22
		technical documentations	▼ 5, 8 ■ 11, 12 — Spatial plan of the Republic; Regional spatial plan Belgrade; PPPPN "Belgrade waterfront"; GUDP: GUP Beograd 2021 (amendments 2003-2005-2007-2014) [xxvii]; Savamala related: PGR for central Belgrade Plan 4 phase 2 [xxviii]; PGR network of fire stations 32/13; PDR Kosancicev venac 37/07, 52/12, 9/14 [xxix]	▼ 8 ■ 11, 13, 15	

UP – urban planning; UT – urban transformations; PDA – participatory & design activities;

▼ political aspects   ■ economic aspects   ● cultural aspects
social aspects (SA):

(1) provisory rules; (2) cumbersome institutional structure; (3) political parties' power over planning, development and regulations; (4) vertical clientelism within the institutional framework (Vujović and Petrović, 2007); (5) institutional formalizations ungrounded in reality; (6) artificial decentralization and democratization; (7) semi-legal institutionalizations; (8) provision of instruments for powerful actors; (9) regulatory gaps in the urban economy; (10) economic aspects strongly influence political aspects; (11) inconsistent institutional procedures; (12) "growth without development" (Vujošević and Maricic, 2012); (13) flawed institutional processes (Djordjevic and Dabovic, 2009; Stojkov, 2015); (14) controversial foreign influences; (15) from an industrial to a service-based society; (16) spatial fragmentation; (17) inadequate educational framework; (18) lack of participatory/communication culture; (19) biased role of the media; (20) apathy of the population; (21) lack of strategic development goals for cultural institutions & agendas (Vujosevic, 2015; Petovar, 2015); and (22) civic initiatives in Savamala lack public support & funding (Petovar, 2015).

investors/investment funds that intervene in the real-estate sector, or from formal/informal international organizations and NGOs involved in bottom-up activities. These actors' involvement, though different in its materialization (real-estate or bottom-up), actually takes place through the same networks (financial, managerial and implementation). In reality, these actors also act as supreme decision making bodies, a kind of top-down authority that makes the network of influence the important factor in local context.

- "redistribute the local" (operationalization)
Recognized top-down urban planning actors are active in planning, regulatory, and consultancy urban assemblage networks. Instead of using urban strategies and distributing tactical operations/ interventions in the urban space, the pillars of the urban regulatory framework (Spatial Plan of Special Uses BWP, GUP Belgrade 2021) in the case of Savamala and the Sava waterfront took on a completely subordinate position and acted as an executive body with particular interests defined elsewhere.

- "connecting sites" (manipulation)
Finally, what occurred in Savamala was the fragmenting of spaces at different levels. In the case of both real-estate transformations and bottom-up activities, certain controversies - from the amenability of urban assemblage networks to networks of influences (i.e., top-down subordination) - arose (Interview 3).

Table 6
Social aspect of assemblage networks distributed across other urban assemblage networks.

		Decision making level		
		Top down urban planning	Real estate urban transformations	Bottom-up participatory & design activities
Assemblage networks	managerial	▼ 1, 2, 3, 4, 5, 6		
		■ 9, 10, 14	■ 10, 13,	
		● 20, 21, 22	● 16, 19	● 16, 17, 18, 21
	verification	▼ 2, 3, 4, 5, 7, 8		
		■ 10, 13, 14	■ 10, 11, 15	■ 11
			● 19	● 17, 18, 21, 22
	consulting	▼ 1, 5, 6, 7, 8	▼ 5	▼ 5
		■ 9, 10	■ 10, 11, 15	■ 9
		● 20, 22	● 19	● 16, 17, 18, 20
	administration	▼ 3, 4, 5, 6, 7	▼ 4, 5	
		■ 9, 10, 11, 14	■ 9, 10, 13	
		● 22		● 18
	planning	▼ 2, 3, 4, 5, 7, 8	▼ 4, 5	
		■ 9, 10, 11, 12, 13, 14	■ 9, 10, 11, 13, 15	■ 9
		● 16, 17, 20, 21	● 16, 19	● 16, 17, 18, 20
	construction	▼ 7, 8		
		■ 9, 10, 12	■ 9, 10, 11, 13, 15	■ 9
	regulatory	▼ 2, 3, 4, 5, 6, 7		
		■ 9, 10, 11, 12, 13, 14	■ 9, 10, 11, 13, 15	■ 9
		● 16, 17, 22	● 19	● 17, 18, 20, 22
	control	▼ 2, 3, 4, 5, 6, 7, 8	▼ 4, 8, 15	
		■ 9, 10, 11, 12, 13, 14	■ 9, 10, 11	■ 9, 11
		● 16, 17, 20	● 19	● 16, 17, 20, 22
	implementation	▼ 2, 3, 4, 5, 6, 7, 8		▼ 5
		■ 9, 10, 11, 12, 13, 14	■ 9, 10, 11, 15	■ 9
		● 16, 17, 20, 21, 22	● 16, 19	● 18
	financial	▼ 2, 3, 4,	▼ 4, 5, 6, 7, 8	
		■ 12, 14	■ 9, 10, 11, 13, 15	■ 9
		● 21, 22	● 16, 19	● 18

▼ political aspects   ■ economic aspects   ● cultural aspects

social aspects (SA):

(Table 5).

4.1. Discussion

In Savamala we identified a dynamic, interactive actor-networks expressed through decision-making mechanisms. The detailed mapping and visualization of these actor-networks also takes into account social aspects while avoiding explanations that simply reproduce social order, power and class (Fig. 6). In other words, the clash between these key narratives is present in the Serbian context today through: (1) the crisis of common social values and civil society standards, (2) lack of healthy investment interests and fair competition, (3) absence of public interest and concern as regards the public good, and (4) power pressures and interference of interests from authorities, business actors and civil initiatives.

When approached comprehensively, urban assemblage networks provide a processal vision of the construction of the Savamala neighbourhood through ANT lens by:

1. **Biased regulatory framework:**
   To begin, significant spatial fragmentation is obvious in the agency of regulatory framework actors. Their interests and projects are almost exclusively oriented towards the highly-attractive waterfront area, with no consideration of the potential or status of the established civil and cultural agency in upper Savamala (Table 5/ 6 - SA 10, 16, 21). The pillars of managerial networks at the
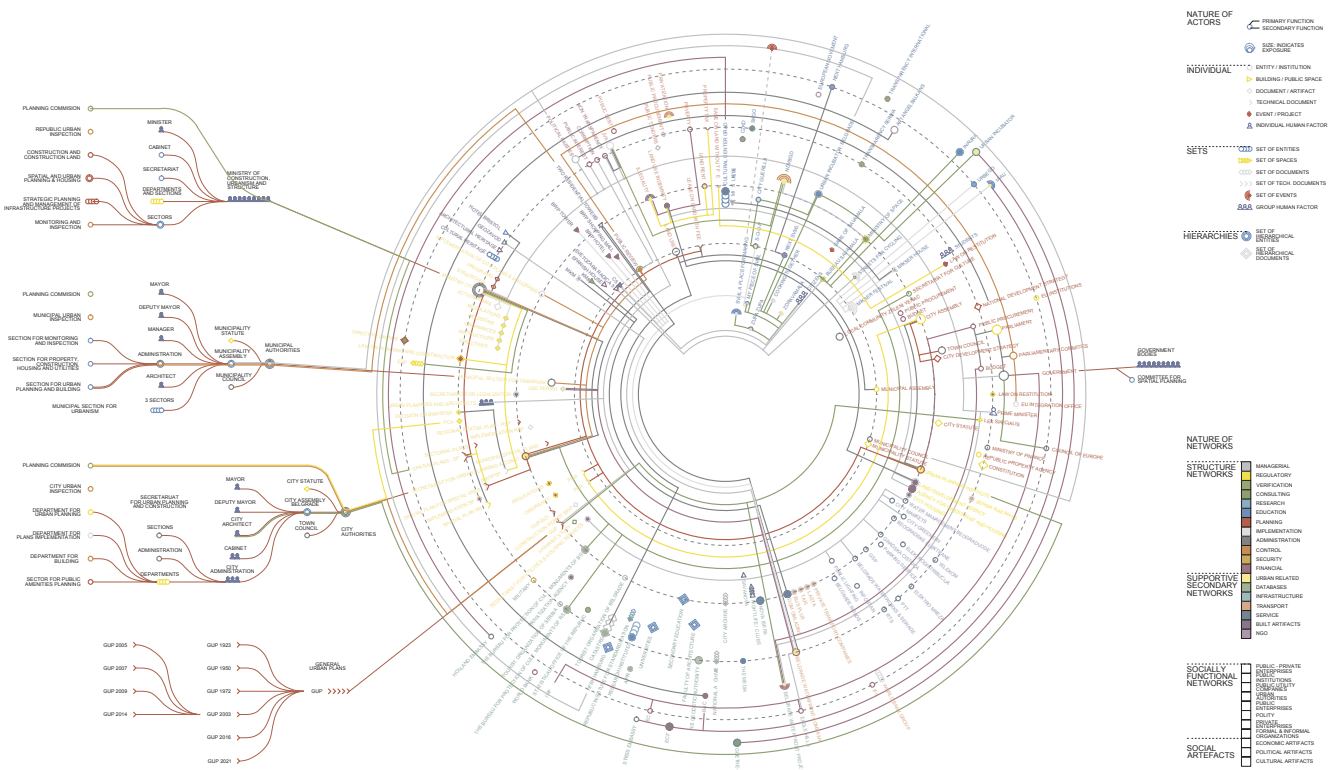
Fig. 6. Savamala ANT diagram.

neighbourhood level in Belgrade are duties of the City Mayor, City Architect and City Manager, introduced in the 2002 Law on local governance (Table 5/6 – SA4). As a practice,[26] these functions have proven to be tied to political party in powerand crucial links (mediators) in distributing key decisions at the city level (Table 5/6 – SA3). Apart from the authoritarian hierarchy of institutionals that empowers certain institutions to exceed or bias their jurisdictions, these administration networks with individual authority in charge of decision making are seriously regarded in the old socialist manner. Namely, most public officers avoid taking responsibility and therefore split it among themselves; practically speaking, requiring many people to sign documents usually slows down the process and postpones implementation (Interview 2) (Table 5/6 – SA1, 2). What is more, the urban regulatory framework in Serbia has no effective means of controlling and verifying, which do not exceed institutional formalities – they are either not applied in reality or their application become rather bogus (Tables 5/6 – SA5). The conflict of interests in many areas is also a point of departure for introducing individual interests into the institutional framework. An overly-powered, authoritarian Nation State as a key actor on city-wide scale (with the Ministry of Construction, Transportation and Infrastructure as the supreme decision maker in planning, implementation, control and verification networks) and the concentration and cooperation of political and financial powers under a new demand-driven economic model have led to unregulated economic incentives and measures as a way of doing business in post-socialist cities in transitional countries (Tables 5/6 – SA6, 8, 9).

2. **Powerful private investors**

The shift from a planned to a market-based economy created a certain void in political and social practices as well as in regulatory, planning and financial networks. Not only do investors' interests now govern building codes and regulations, but the former also

enjoy unregulated economic incentives and measures for acquiring valuable urban land in public to private ownership transition processes (Tables 5/6 – SA7). In such cases, public institutions' financial involvement also becomes problematic, e.g. the growing imbalance between the social role of the budget (public social services) and its developmental role (market-oriented)[27] (Tables 5/6 – SA12, 15). A prime example of this is the adapting of urban regulations (privileged foreign/domestic developers) and public-private partnerships around the Belgrade Waterfront Project (Tables 5/6 – SA13). Most of regulatory, planning and implementation processes (networks) surrounding the project were conducted behind closed doors, with strong market interests behind it. The only ones to defend the public interest were Transparency Serbia NGO, the National anti-corruption agency and NDVBGD collective (Tables 5/6 – SA11, 18, 19). The joint venture agreement between the foreign investor and the Republic of Serbia signed in April 2016 (JVA, 2016) is an example of a biased, financially dangerous, binding document for Belgrade and Serbian society as a whole. Not only is it a case of unequal distribution of resources, but also a certain way of abolishing the country's sovereignty and territorial integrity on the Belgrade Waterfront plots of land (Interview 1, 2). The strong spatial relationship of the foreign investor's activities speaks to local inability in addressing and solving the issue of the prolonged regulatory gap in terms of investments (Questionnaire 1). In this way, the secondary network involvement of Eagle Hills indicates that corporate and international capital representatives manage to find the weakest and most profitable point of entry into the local, unregulated and (still) centrally-governed land market in Serbia (construction networks) (Tables 5/6 – SA14).

3. **Un-institutionalized culture**

This concentration of culture, creativity and innovation in Savamala

[26] The distributing of publicly-owned empty plots and land in Savamala to private investors/owners.

[27] The BWP is officially announced as a project of special importance for the Republic, which is investing considerably, even though 80% of BW spaces are allocated for housing and commercial purposes (Zekovic et al., 2016).

is also the result of the transition toward neoliberal markets and country's opening to global funding, trends and guidelines (Questionnaire 1). This limited scope of intervention and radical change in the urban visions from "big is beautiful" to small and private is emblematic of the non-intrusive commercialization of arts and cultures (Interview 5). In other words, Savamala's creative cluster was not unique, but rather a typical example of the current European wave of popular urban culture (The Guardian, 2016). Thus, the local cultural, artistic and civic scene seems to be entirely dependent on global influences rather than being an independent, bottom-up movement. Though some experts say that Savamala has created its identity based on civic activities (Interview 5), others claim that these programmes were too professional for ordinary people to take an active part in them (Interview 2). Citizens shared a similar opinion, and explained that it seemed to them that foreign and local organizations' solutions and visions were prefabricated, and with no concern for the true needs or ideas of the local population (Interview 3, 4) (Tables 5/6 – SA17, 20). However, these small-scale socio-spatial projects also indicate a strong lack of strategic development and few links with the national institutional framework and financial model (Questionnaire 1) (Tables 5/6 – SA22). The urban reality and developmental situation in Savamala illustrated here reflect the transitional chaos many post-socialist countries face. Capital cities in particular are emblematic of such "development schizophrenia" (Vujosevic, 2015) while at the same time being the political, economic and cultural legacy of once centralized state.

5. Conclusion

Bearing in mind that the initial actor/actor groups were identified based on the morphology of urban decision-making, this extensive ANT analysis has argued in favour of representing its amenability/conduct in terms of the overlap and collision of different urban assemblage networks. Most pre-existing methodological approaches in urban development studies consider certain socially-bound explanations (e.g. dichotomies of importance-influence, impact-priority, power-interest, support-opposition and constructive-destructive attitudes) as self-contained explanatory categories for mapping actor/stakeholder involvement in the social realm (Mathur et al., 2007). However, the ANT approach starts from the other end. Its vitality lies in: (1) an encompassing view of the active role of non-humans, (2) seeing the totality of the world as process, and (3) establishing overarching, radical categories of time and space by representing horizontal links and associations. In this manner, the ground-up ANT analysis performed here provides answers about how urban decision making is processed in Savamala and enables argumentation on why mentioned social dichotomies are still at stake in post-socialist neighbourhoods.

This visualization based on the ANT methodological approach (Fig. 6) is an attempt to depict the complexity of urban actors, forces and artefacts as a comprehensible pattern of links and nodes, inspired by a similar attempt by Marshall and Staeheli (2015).[28] In our approach, we retain certain standard concepts from urban theory and practice, but reinterpret them using the ANT logical framework, there-

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[28] We would like to emphasize here that our findings are similar (with different conclusions, however) in urban research, as they were in the social one and deserves to be cited here.
"The network representations provide order and straight lines to a world of messy relations, neatly cropped here [..] We know that as representations of infinitely more complex, subtle, and fluid relations, these network diagrams are but an abstract simplification. And yet, the research process as such continuously moves between conceptual abstraction and empirical analysis, whether this is always explicitly acknowledged or not. These diagrams provide a useful visual way of formally expressing these abstractions, not as a final, definitive representation of an actually existing civil society, but as a starting point for further research to complicate this view." (Marshall and Staeheli, 2015).

by clarifying the types of networks (urban assemblages) these conflicting social aspects address. We recognize the quality of the ANT scientific approach as an explanatory construct that studies associations and symmetrical relationality (Farias and Bender, 2009). Without addressing any particular state of affairs, this new perspective minimalizes the importance and influence of the permanence of urban structures across time and space, and instead deals with the city as the contingent, fragmentary, heterogeneous but persistent product of human and non-human actors, intermediary and mediator roles, concrete associations, stabilizing and destabilizing agencies and urban assemblages. We have shown that all of these elements are spatially embedded and harmonized in the specific physical set of Savamala.

The potential of such an ANT illustration at the local level with a strong relationship to "the global" is that it provides information-loaded associations without any notion of value, which could potentially bias readers. Namely, the networks could be interpreted differently depending on the interpreter's background and interests, but still maintain the minimal amount of information already inscribed through the manner of visualisation. Another quality is its data saturation and contingency, and capacity to expand on the complexity of the social world. The introduction of qualitative tuning for nodes/actors (the nature of elements) gives it a self-contained dimension. Another advantage relative to other ANT diagrams is that it embodies internal networks (the nature of elements) as well external ones (assemblages). Moreover, it maintains a relationship to spaces by concrete spatial references of social distributions (actor-networks). In sum, these features facilitate the digitalization of the diagram and keep its dynamics in line with reality. Furthermore, digitalizing the diagram may enable the inclusion of a 3rd dimension and the visualization of the time component through the stack of parallel layers. Although stacked, these time-space realms of the social world are also interconnected and represented as social continuity – in other words, what they are in reality.

ANT's ability to enable explanations from within and ground-up makes the task of relating and distributing agency through networks a never-ending story that is also dependent on the participant/researcher carrying out the work. Thus, even historical transpositions and role links through networks become ephemeral, and should be put to inquiry through multiple perspectives when possible (Latour, 2005, pp. 256–257). In this respect, we question ANT's theoretical pretention of explaining the world without relying on "other" frameworks (Lee and Brown, 1994; Gad and Jensen, 2010). ANT's extraordinary ability to describe (Gabriel and Jacobs, 2008) limits its explanatory scope, leaving the politics of influencing of reality to social scientists. However, it seems that practice-based and informal research do not particularly benefit from ANT, although it has the advantage of offering explanations from the participant's perspective. In this respect, bearing in mind that we have broadened the scope of ANT categorizations and interpretations and have dealt with urban complexity to a certain degree, we argue that non-scientific actors are incapable of using ANT as an interpretive tool for addressing undercover processes and mechanisms or providing explanations, recommendations or operational diagnoses on how to cope with developmental dynamics of maintenance, transformation and/or change in an urban system. Thus do we argue in favour of methodological revisions, adaptations and/or complements in the form of hybrid methods to operationalize the dynamics at the neighbourhood level and reframe the complexity of the practices, transformations and conflicts constantly taking place and giving birth to new realities and urban development prospects. Such hybrid methods might provide a framework for constant extension of the number of actors and new relations when they collide, overlap and interfere in networks.

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