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Design and Politics: Metadesign for social change

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Abstract
In recent years, a collaborative approach to solving socio-urban problems has become common. In some cases, organizational changes have been worked out in enterprises and governments to accommodate the collaborative process, and people started recognizing the already present collaborative aspect of the creative process. Nevertheless, a rigorous theoretical/conceptual background that can sustain continuous social innovation based on accountable experimentation is still majorly lacking in these contexts. The specific approach elaborated for Metadesign by the author can provide a bridge between these innovative intentions and a new epistemological framework that has emerged from contemporary philosophy, anthropology, and complexity theory. In the context of the so-called "Smart City", Metadesign could serve as an accessible approach to the democratic organization of communities so they can perform qualified and consequential creative work, including rethinking their own role in urban planning (meta-action). This approach is based on a new social interaction repertoire, partially derived from the popularization of digital interaction, but also from a new epistemic: complexity theory involves extreme shifts in the prevailing epistemological outlook, requiring new cognitive tools to cope with the increasing cognitive load in social interaction needed in collaborative creative work. This new epistemic also involves changing the way we frame objects of knowledge, recognizing new "objects of design", of particular interest to the Metadesign action, that can mediate social change in a concerted and conscious manner.

Keywords: metadesign, urban planning, social change, innovation, micro-politics, smart cities.

Introduction

Paul Virilio (1995) has used the term "Metadesign" to allude to the widespread reality of social contexts conceived by a minority by way of concentration of political power, and not created by citizens in a concerted manner – i.e. "Metadesign" as the contradictory but recurrent socio-political action constructed as the illegitimate organization of the social regulatory meta-structure that we call "legislation". I do not think that this very common situation has been planned to be like this – it has emerged from a very limited social interaction repertoire, which is characterized by a barrier between two very different social scales: the community and the State. My proposal is to bridge these two scales by way of a set of social games developed through Metadesign. In this sense, "Metadesign" is not necessarily an illegitimate process, but in fact an inevitable stance towards social complexity, allowing a large number of people to interact in a concerted and meaningful way. What these social games can do is to simultaneously activate two very different cognitive modes: "savage thinking" (Levi-Strauss, 1989 [1962]; Clastres, 2003; Deleuze and Guattari, 1987; Viveiros de Castro, 2015) and "instrumental thinking" (Horkheimer and Adorno, 1969).

I have re-interpreted Metadesign to make it work in a very wide array of techno-social contexts (Vassão, 2010). Metadesign can aid people, communities and organizations in creating new social diagrammatics (ecosystems) and/or adjusting existing ones. Through this re-interpretation, Metadesign is a set of four cognitive tools: (a) diagram; (b) abstraction; (c) emergence; (d) procedure. These are, in themselves, open sub-sets of different tools and methods, and they interrelate in multiple and intricate ways. Their usage constitutes a non-specialized approach to design, applicable to any context. Rigorously, Metadesign is an umbrella concept that encompasses any and every design action and/or method – not because it has foreseen or could foresee all of these, but because the four mentioned cognitive tools are, in fact, four different aspects of the human cognitive abilities when applied to consequential activities, i.e. trying to do something in the world – so any design tool, method or concept could be seen as a specific articulation of those four, which have been identified from three fronts: practical field work, bibliographical survey on design methods and philosophical inquiry on the poietic process. In this paper, I will briefly present the four cognitive tools and summarize their possible application contexts, paying special attention to micro-political action in urban contexts.

Diagram

Since its inception as a field in mathematics, in the beginning of the 1800s, topology has come to change not only mathematics, but also all other sciences, and has had influence on many diverse fields such as psychology,

engineering, architecture, and electronics. Piaget has considered it the basic cognitive competence of the human mind, indicating "schemes" as a inescapable cognitive entity (Piaget *et al.*, 1969). Topology is so fundamental to the human cognitive processes that we learn how to naively articulate it in our childhoods and later dismiss it as "too simple", all the while missing or misusing it to understand the world around us. The most direct and accessible way to make topology tangible is through diagrams, which can be very simple or extremely complex. A very important aspect of diagrams is that they do not limit themselves to representing reality: they actually articulate *new realities* through their own constitution. From Deligny (2015), through Lévi-Strauss (1989 [1962]), Piaget (*in* Piaget *et al.*, 1969) and Deleuze (1988), the diagram has come to be understood as a way to present, or "apresent"[1], realities: meaning to introduce, to posit, to poietize, to exercice poetics.

Of course, diagrams can represent realities – i.e. to make the absent present. But its importance in Metadesign lies in its ability to create, in a pre-linguistic manner, very complex, intricate and operative entities – a diagram makes present a reality, in the same way that an electronic circuit does not represent but *is* the flux of electrons; also a fluvial system does not represent but is the flux of water.

When we face a situation so complex that a verbal or written description fails, we resort to diagrams. Since the dawn of ecology, ecologists have been studying and understanding ecosystems through diagrams. The Apollo (NASA moon landings) and Polaris (US Navy nuclear missiles) programs – both extremely and notoriously complex projects – have developed CPM and PERT methods, both heavily dependent on diagrams to activate (and not simply represent) social productive circuits – through Gantt charts, critical path diagrams, sequence analysis, etc. Cybernetics employs a heavy use of diagrams to design, represent and build systems. Deleuze (1988) suggests that to better understand Foucault's assertions about the panoptic, it must be seen as a diagram that can be "apresented" in architectural form, or otherwise in the bureaucratic complex that constitutes the industrial world's disciplinary system.

Through topology, and its applications in any field of knowledge and action, we can recognize recurrent patterns in a very efficient manner: isomorphy ("same form") of different systems can be easily detected through their presentation in diagrammatic form. In fact, Baran (1964) has been able to classify, through the use of diagrams, all telecommunication networks in three types: centralized, decentralized and distributed networks – having direct consequences to the emergence of the Internet as we know it; Deleuze and Guattari (1995 [1987]) have characterized two dichotomic cognitive, social, economic, political, linguistic and aesthetical modes: the Tree and the Rhizome, two different diagrammatical configurations that pertain two conflicting approaches to whatever aspects one might consider in the world – incurring in identifying two social-political-aesthetical stances: the sedentary (civilized), statutory, centralized Tree; and the nomad (savage), communitarian, and distributed Rhizome.

To design making use of diagrams and topology opens up the human mind to new levels of complexity, making it reach to meta-contexts, and understanding the inherent limitations of specific social-political configurations – being that in the urban space or in the meta-space of social politics. Especially, it is very useful to utilize diagrammatics to describe and articulate social gatherings and organizations, being them short- or long-term, and small- or large-scale structures.

To such context, there is a "topological typology" that I have developed based on both Deleuze/Guattari's Tree-Rhizome dichotomy and Baran's tree types of networks. Such scheme is very elucidating regarding socio-political structures, and it is based on a pragmatic take on the cybernetics/ecology concept of the "relational space" (Ek, 2006): the position of a entity in a network (or diagram) indicates the tensions that repose upon it – even if the occupant of that relative position in the system is replaced, the tensions will remain relatively unchanged, so does the behavior of the entity. So, if there is a desire or need to change what is being, or not, accomplished by a group, community or organization, there must be a change in its organizational structure: different people must occupy different positions, linked by different connections – the relational space must change.

Generally speaking, there would be only five basic topological types – this is obviously a gross reduction of the inherent complexity of the social world; but, nevertheless,

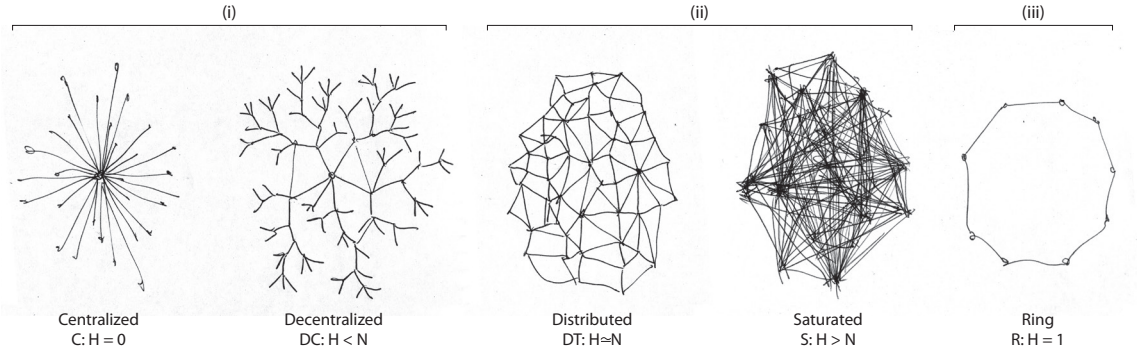

Figure 1. Topological typology.

[1] I take a risk on using an Anglicization of the Portuguese word "*apresentar*", meaning: to produce, to present, to make apparent.

it is extremely useful do recognize recurrent patterns, and the outcomes that they entice. It is also important to have in mind that these types can indicate different aspects, regions or levels of a more complex and thus less reducible system. The five types are (Figure 1): (a) centralized systems, (b) decentralized systems, (c) distributed systems, (d) saturated systems, (e) ring systems. The first two (i) comprise trees, hierarchies, cladograms – systems that have a clearly defined central entity, but may or may not branch out into regional centralities (branches, *klados*); the second two (ii) are variations on the rhizome, being that the distributed systems local connectivity, or the physically improbable saturatedly connected systems (every node is connected with all other nodes), and both comprise open organizations; and the last one (iii) the ring is a single-holed entity, like all vertebrate animals (digestive tube), but also all social gathering dealing with an specific matter: there is the need to fill this hole with meaningful things (food, affection, ideas, purposes, expectations, etc.). Through this topological typology we can identify which type of connectivity we're dealing with, or trying to create: if an organization wants to be more "innovative" – i.e., open to new ideas – the first (i) type of system is a very inadequate configuration; but otherwise, if an organization wants to have a very clearly defined command and control circuit, it should go exactly for the first (i) type, allowing hierarchical governance, excluding divergent behavior. But the metadesigner must be aware that these types indicate aspects of the reality being mapped, and cannot contain or summarize the concrete complexity inherent to any living ecosystem (being that an organization, a city, the human body, the environment), and he or she must be available to compose different types regarding different aspects, and connect them in a "meta-diagram". Interestingly, this meta-diagram can be, in itself, a version of any of these five basic types.

Abstraction

The Greek word "logos" refers to an array of meanings: to analyze or to synthesize (to separate and to join), to communicate (through words), "word", to talk, to understand. Aristotle postulated "logics" as the formal articulation of language – but it was only two and a half millennia later that Boole posited binary algebra as a completely artificial formal language, the current underlying ground on which stands information technology. Abstraction is the separation or joining that happens through the use of language: we encapsulate groups of entities that compose a system to reduce its complexity, maintaining the cognitive load below our minds' limitations – by aggregating blocks of things an naming these blocks. This is, of course, a meta-reduction: the reductive description of the reductive process. But, for the purposes of this paper, it is enough to understand that abstraction is the process of composition and decomposition of systems, assembling (compounding) and disassembling sets of objects, having (written or spoken) language as an ever-present labeling and abstracting activity.

Cybernetics and Complexity Theory present any system as composed by "levels of abstraction". This is the formal ability to understand the successive layers that compose reality: through coupling, encapsulation and modularization, we are able to articulate layers of complexity in very large systems. In biology, for instance, we can regard the lowest level of abstraction – chemical bonds between atoms – as the basis for what can be constructed by these basic modules – organic molecules –, constituting a specific level of abstraction, studied by molecular biologists. On top of molecules, sits another level of abstraction: cell organelles, which are composed of molecules. On top of organelles, sits cells, which compose tissue, that are the basis on which organs form, that are the constituents of bodily systems, which compose bodies, that compound into communities, which compose societies, that are the basis of ecosystems – from the atom to the planet, in ten steps, or "levels of abstraction".

The same approach can be applied to artificial systems, such as industrial products or computers: specific modules are grouped in operating modules, that compose further operating modules, compounding levels or layers of complexity or abstraction.

For the sake of a summarized presentation of Metadesign, these levels of abstraction can produce two kinds of entities: taxonomies or models. *Taxos* means "class", and taxonomies organize entities into classes, allowing

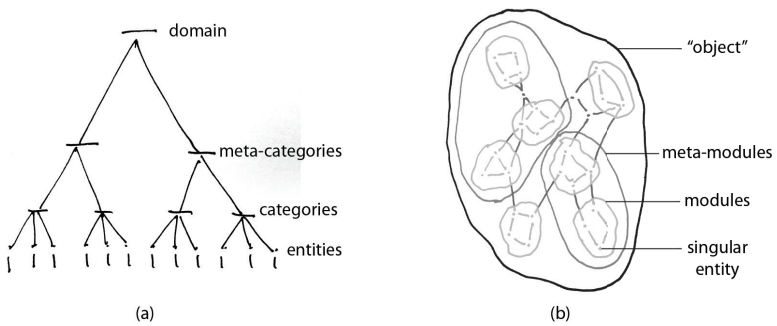

Figure 2. Taxonomy and model. Here we use diagrams do illustrate two different aspects of abstraction. (a) The typical taxonomic tree, used in biology, library science, information architecture, etc. And (b) a generic example of a model, composed of entities that are encapsulated on modules, which are encapsulated in larger meta-modules, and so forth, until we have an "object", like an automobile, for instance.

the inventory of complex systems. To some degree, the person or community interested in organizing a "domain" arbitrarily defines taxonomies about it, be that the political system of a country, the available auto parts in a car factory, or the world's living species. The word "model" shares the same etymology as "module", meaning "to measure" – it is the description of the different sub-systems of a meta-system, the working components of an operating unit, or the simple parts that compose a product or object. Through modularization, a highly complex object, composed of myriad parts, can be assembled in a concerted manner, entailing many levels of abstraction.

One crucial aspect of abstraction, and of the use of language to articulate complexity, is a system's level of formalization: in everyday colloquial speech, people communicate in a very low level of formalization; differently, a computer processes strictly formal signs in an artificial language free of ambiguity. The higher the level of formalization, the lower the meaning of what's being conveyed: informal, or para-formal communication convey lots of meaning, in a very ambiguous manner; while the strictly formal Boolean algebra means literally nothing – only through human interpretation does a computer communicate anything. The level of formalization is also an important part of the communication systems utilized by communities (low level) and statutory systems (high level). Both can produce different consequences and both are important in constituting a new form of social-political integration.

A final aspect of abstraction that is useful here is the relation between "patterns" and "standards": patterns are para-formal aggregates, not necessarily organized in a perfectly defined module, they are accessible to non-specialized personnel, and promote creative interaction; while standards regulate the exact composition of an entity, from the viewpoint of large-scale organizations, allowing interoperability, components replacement, homologation and complex industrial product architectures. Alexander pioneered the "Design Patterns" movement, trying to set up a community-based urban planning approach, utilizing approximate patterns as the basis for the configuration of architectural and urban projects (1979). Later a group of programmers bridged that intent into the computer and information technology arena, making design patterns a common way to organize large-scale projects (Beck and Cunningham, 1987). One interesting situation in which abstraction, patterns, standards, and formalization all come into play is the way Free Software programmers interact with each other during the creative process: many different levels of formalization are used in different moments of the development of software – from the low-formality, high-meaning, interaction in initial phases, to the high-formality, low-meaning (measured by the level of creative action and accessibility) interaction and documentation in later stages.

The communication games people play in society, in organizations, enterprises and communities all entice different levels or formalization, articulating different subjects that are, in fact, our attention directed to different levels of abstraction. Metadesigners should be able to direct, interfere and manipulate these communication games, taking part in them and also proposing changes and new games (see the section "Procedure").

Emergence

In 1948, Weaver posited that science was lacking adequate methods to understand and to act upon what he called "organized complex systems" – such as living systems, cities, the economy, and populations –, and suggested that new epistemological approaches were needed to deal with them, probably requiring computational methods. Not long after Weaver's suggestion, Jacobs (1961) utilized his idea about "organized complex systems" to characterize healthy urban communities as self-organized, from the ground up, in a grassroots or bottom-up fashion. What Jacobs noticed was that urban communities had the inherent ability to organize themselves in a meaningful and complex manner, and that over-controlling centralized planning schemes (common at the time, and still the norm today) make it difficult for this self-organization process to happen.

Hardt and Negri (2009) utilize Deleuze and Guattari's assertions about turbulent systems, the singularity of persons and the creative process, and the necessity to understand the multiplicity in which this singularity incurs (Deleuze and Guattari, 1995 [1987]), to develop their critical concept of the Multitude, denying that it can be reduced to the "people", or "the masses", or "population". Hardt and Negri affirm, in a different but related fashion to Weaver, that probability and statistics can't deal adequately with the complexities of social life's concreteness: we've been overly dependent on very limited constructs derived from a statistical epistemology – what Weaver refers to as "disorganized complex systems" –, such as "population", "target audience", "means", "modes" and "medians" – which have reinforced ancient beliefs about "universal types", now considered knowledge products validated via data gathering and processing.

During the past sixty years or so, a new epistemological approach has been amassing into what is currently called "Complexity Theory". Chaos Theory, Fractals and Artificial Life, are all scientific lines of inquiry that led to new understanding of the inherent complexity and self-organizing abilities of living and non-living systems. The main aspect of the systems studied in these fields is their ability to self-organize in an emergent fashion: micro-interactions, in the smallest scales, lead to incredibly complex macro-aspects of the system. One instance is the vastly complex and coherent behavior of animal societies, such as anthills, beehives, bands of birds and schools of fish: relatively simple behavior traits observed in micro-interactions between individuals or small groups of individuals can compose themselves into increasingly complex behaviors as we increase the scale in which we regard that society.

As Mcluhan said, "we look at the present through a rear-view mirror [of a car]" (Mcluhan *et al.,* 1967, p. 74-75): we can see the world in its complex interactive dynamics only after it has been realized, or actualized. By looking into micro-macro interactions we can see why there were so many ecological disasters in the past – from the Neolithic depletion of the European forest system, to the 1930s Dust Bowl phenomenon – the amassing of complexity was so poorly understood that when a small change in the behavior of self-replicating entities (ourselves) had a tremen-

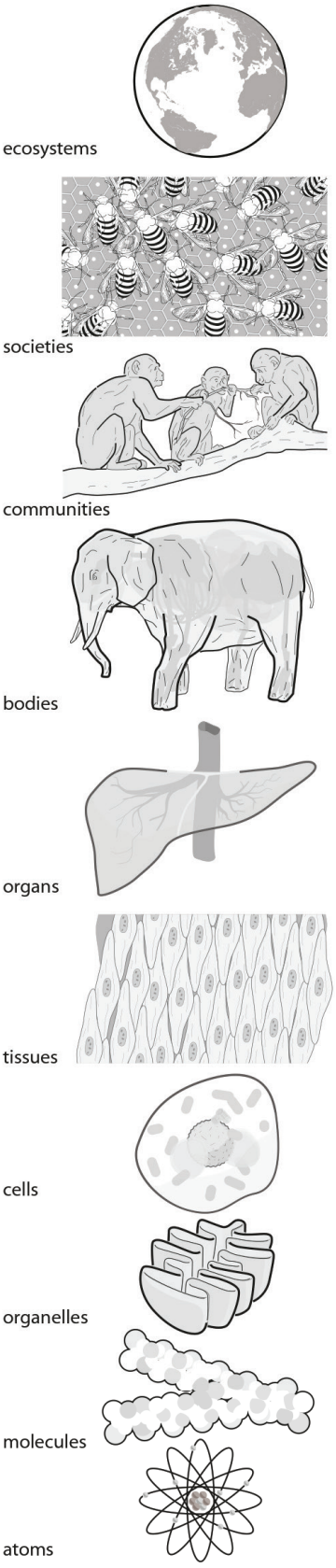

Figure 3. Micro-interaction, Macro-contexts: interactions inside a level of abstraction, interactions between levels of abstraction – generally these interactions amass so quickly that both our available computational power and our personal cognitive reach shy away of understanding the macro-consequences in context-weaving.

dous impact in the larger layout of the ecosystem, we were not able to cope with its disastrous effects.

So we need to think in ecosystemical ways: experimentation in small contexts is crucial, so we can err more often, without worrying so much about large-scale outcomes. Not only to avoid ecological catastrophes, but also to allow society to self-organize in more sophisticated, complex, and subtler ways than we can envision or anticipate, when we try to design macro-contexts without taking micro-interactions into account.

So also, we need to be aware that the emergent principle indicates that, through self-organization, changes in quantity incur in changes in quality: larger systems are not just bigger, they are different – they change and reconfigure themselves as they grow, creating new socio-political realities. Examples abound in history. To mention just three: (1) The printing press became the basis of modern nation-states (The "Gutenberg galaxy" mentioned by Mcluhan, 1962); (2) The personal automobile engendered city suburbs, urban sprawl and the current geo-political energy crisis; (3) The Internet is inducing new modes in politics, rapid and "chaotic" socio-economic growth, and the demise of long-standing revenue models. These large-scale consequences – in space, time and society – emerged from relatively humble beginnings: none of the initial proponents of these three instances were aware of the eventual effect their inventions were going to inflict upon human culture.

To understand emergence, the concept of levels of abstraction mentioned earlier comes in handy: micro-interactions take place in a lower level of abstraction than macro-interactions – micro-interactions regard micro-politics (tactical, communitarian, local, disruptive, *apresentational*, bottom-up activities), and macro-interactions regard macro-politics (strategic, State-based, legislative, elective, stabilizing, representational, top-down activities). Micro-politics take place in a low-formality environment, absent of statutory codices, through activities that spring up from affections and local interaction. Macro-politics take place in a high-formality environment, based on legislation (a statutory codex), commonly made operational by representative elected leaders. Micro-politics is where deep meaning is constructed through meaningful interaction; macro-politics is where ideology is produced and reproduced via an official narrative. Obviously, micro-politics and macro-politics are not simply and necessarily attached to social scale, but that is a fundamental part of their interactive dynamics: any gathering, regardless of its social size, can become a State through the adoption of a formal statute; but micro-political interactions, based on savage thought, can only take place in small groups (see the section "Quantity and Quality").

The question is: how can we operate a consequential and meaningful dialogue between these two levels of abstraction – between the savage and the instrumental, the micro- and the macro-scales, between the deeply meaningful and the overarching ideological?

Procedure

One established definition of the term "relational space" is a space that is defined by the relations between

the objects that compose it. In that sense, we have several possibilities on designing spaces and objects. To topologically minded metadesigners, "spaces" and "objects" are the same – the accepted notion of space as a container, and the object as content, is just a matter of perspective: a good image is the Russian doll or *Matryoshka* – each doll nests inside other dolls, container and content are the same. The practical consequence of that is that what you know about one applies to the other, depending on the level of abstraction you choose to regard the concrete situation: space or object. For instance, all "*topology typology*" that we analyzed for relational spaces applies to the configuration of objects. Other instance is that every innocent object we see is also a container-space for other objects and sub-spaces – meta-spaces containing sub-spaces; sub-objects contained by meta-objects. The second instance is that if objects are in fact processes – stabilized, self-reinforced metabolic cycles – then we must understand the procedures, rules, laws or what I call the "internal procedural configuration" that enables that process to come into being, becoming (*devenir*).

I consider that the broadest cognitive concept, in this matter, is the "magic circle", proposed by Huizinga (2016 [1938]) to describe the space in which games, playful circumstances, rituals, in fact all meaningful situations take place. Initially, Huizinga described it as a "space" in the sense of a place in the built environment. But the magic circle is better understood as a relational space brought into being by the actual playing of the game. What defines the configuration of the game is the set of rules that define what can and cannot happen inside the magic circle, being them explicit or implicit rules that must be learned and taken into account by the players, and put in action by the pre-configuration of the material space of the game, among other possible rule-limits that constitute the reality inside the magic circle. This notion is very elucidating for the nature of the built environment: it is a process, not an object in the naïve sense, and it is brought into being by the articulation of actions directed by *procedural limits*. So, the most basic aspect of reality – the space we inhabit – is a process actualized by our own cognitive actions. This is very explicit in the way we inhabit the non-euclidean space of Earth's surface.

Spaces (and objects) must be considered topological "manifolds": I take the specific meaning of this term from Schroeder (2005), who pedagogically speculates about the fictional existence of socio-cultural spaces ("manifolds") as so hermetically sealed from each other that they can share the same meta-space and, even so, the inhabitants of each manifold still be completely unaware of the inhabitants of the other manifold. In this very *political* view of the nature of spatiality, the naïve Euclidean notion of an all-encompassing three-dimensional space collapses or is melted into a "myriad space" determined not by presumably a priori definitions, but by the dynamic interplay of several sub-spaces, or manifolds, that relationally compose, or (re-)lay out, the actual configuration of the meta-space.

It is interesting to mentally visualize the Euclidean three-dimensional space being flattened into an irregular two-dimensional surface similar to a sphere: the actual living space available to humans in our planet – the thicker atmospheric space is only available to flying animals that can defy the "rule" of gravity. Conversely, it is interesting to see how the internal space of a house seems to expand in pace with our crowding of it with furniture, personal belongings, curtains, etc.: a manifold being unfolded not by physically expanding it but by increasing its spatial complexity, much like our intestines' villus: increasing the number of entities inside an enclosed space invites our perception to recognize a larger set of topological connections – and this is key to convey largeness or smallness in spaces.

So reality is brought forth not only from pre-existing nature, but especially by articulating procedures that enforce specific dynamics. These can be the explicit rules of a game, the statutory legislation of a nation, organization or enterprise, etc. In a broader sense, *procedures* can be computer programs, culinary recipes, chemical or pharmacist's formulas, or a design method. In the context of metadesign, a procedure is a completely or partially formalized sequence of actions that are conducted by people, machines or organizations, and that actualize a certain mode of reality. In a very formal sense, a procedure is an algorithm: a formalized set of actions that use certain inputs to produce certain outputs. The metadesigner must be able to rise from the position of a player of the game (procedure), surpass the operative position of the referee or umpire, and invent new games or propose changes in the rules that govern and specific game – and occupy the position of the "game inventor". That is the most particular metadesign activity: to create new realities or modification in existing ones.

Regarding political creation of meaning, metadesign can organize creative social games that promote meaningful interactions that can produce significant results, or invite the participating community into the "game inventor" activity – in such a way that *metadesign becomes the utmost democratic activity*. But metadesigners must know that Virilio's view on metadesign is an always-present danger: the concentrated effort to organize new procedures can be the utmost tyrannical action.

In the context of urban planning, metadesign can bring forward several specific social games that allow micro-politics to interact with macro-politics, to *apresent* savage thought in the eyes of instrumental thinking, and vice-versa. Such games are becoming common in various initiatives such as "Design Thinking", the "Art of Hosting" umbrella concept, "Theory U", and so many others. But, in general, these initiatives lack a theoretical background that can provide a rigorous framework for sustained experimentation, responsible accountability and a broader acknowledgement of collaboration's role in democratic action. Because of the haphazard conceptual set up of these social games, it is not uncommon for their practitioners to be unable to articulate what I've called micro- and macro-interactions, to be unaware of the differences between savage and instrumental thinking, and their inherent potentialities and limitations, and also to incur in tyrannical actions, even if unintentionally.

Metadesign can provide a strong conceptual grounding to group work, community organization, and governance, which would sustain collaborative actions in an open but rigorous approach. This is particularly useful in the context of the fast spreading of digital technology in

daily urban life, which entices the proliferation of new socio-urban habits. The complexity of urban life is increasing in such a pace that a "social-political action singularity"[2] may have already surpassed us: digital technology may have rendered our traditional cosmo-political views inadequate to cope with political action in a meaningful way. As a counter-measure, metadesign could expand our abilities to organize complexity, providing an accessible and open operational reference for small and large-scale social self-organizations outside statutory codices.

The main action, or social role, of a "metadesigner" is to design relational spaces through the laying out of rules, laws or procedural limits that entail a consensual reality. These relational spaces are the meta-spaces in which a significant situation can take place, and they cannot be reduced to what architects traditionally consider to be the built environment or urban space: the collection of material entities that compose buildings and the urban infra-structure. These relational- or meta-spaces can comprise several different types, they are better described as *diagrams*, all have several and complex *abstraction* levels, and they express *emergent* behavior that cannot be foreseen by its designers/inventors/creators. Of these different types of meta-spaces, three are described in this article: *Manifolds*, *Metabolic Cycles*, *Machines* and *Meanings* – these are things that can be mapped, articulated and activated through metadesign.

Manifolds, metabolic cycles, machines and meanings

In speculative fiction, Schroeder (2005) describes *Manifolds* as technologically and perfectly articulated social spaces. I propose that actual existing contemporary manifolds are imperfectly configured socio-cognitive spaces that direct peoples' attentions and, conversely, are directed/configured by peoples' actions: socio-political constructs that, much like Huizinga's situations or games, emerge from coherently and mutually integrated actions of the game participants. From the person's point-of-reference, the manifold he or she inhabits is the only viable reality available – the more attached a person is to that manifold, more rigid, exclusive and all-encompassing it will seem to be, more like a "world". In anthropological terms, a manifold is more *and* less than a "worldview" or a "cosmology", despite being very similar to them: it is more spatial, by limiting and directing embodied action/perception; and it's less verbal or symbolic, not being necessarily defined by a founding narrative. It directs one's perception of what can be done in the perceived world in spatial terms, and it affects one's embodiment, how his or her body can displace and enforce itself. A manifold is constituted by several kinds of coherent habits: language habits, technology habits, perceptual habits, political habits, bodily habits – it is something like the *habitus*, the aggregate of recurrent and recursive actions that are embodied in daily actions. The built environment is a part of this aggregate and by far *not* the fundamental part of it – this is expressed by the increasing amount of modifications we are imposing to buildings and the city in recent times, brought by the increasing pace in which we are changing our manifolds, our *habitus*. To understand manifolds, we must describe them through "maps" that are not limited to what we can see in cartographical maps of territorial geography, but must also demonstrate connections between different regions an aspects of the relational space we inhabit: isn't this the *concrete city* we live in? Debord has tried to map the city of Paris that he had in mind, as an inhabitant: his "Naked City" (1957) is an affective urban map, and not like the Paris we see in a topographical map. But the mapping of a manifold must also contain linguistic practices, imagerial patterns, movement mapping. Maybe something like Eric Fischer's emergent maps of the world, making visible complex telecommunication versus territorial habits.

Metabolic Cycles are a fundamental aspect of biology. We can consider them to be a relevant part of the term "reality", considering it as the diagrammatic and/or symbolic, and therefore incomplete, mapping of the ecosystem: a living object understood as a "stabilized and enduring metabolic cycle". This incurs in accepting that "objects" can be something very different from "massed blocks of matter": they can be "diaphanous fluxes". Some are already recognized, such as the water cycle (involving perspiration, evaporation, condensation, and precipitation), in the macro-world of the entire planet, and the Krebs cycle (involving the metabolism of chemical energy), in the micro-world inside living cells in every organism. If we're going to consider metabolic cycles as objectual entities, our understanding of objectual reality must be adjusted to put the idea of universal entities "in parenthesis" – and we must recognize individual objects (be them composed by "massed matter" or "diaphanous fluxes") in their inalienable singularity. Deleuze would say that, on traditional epistemics, to affirm an entity's typological identity is to affirm its validity, but that would not make it recognizable in its singularity, and only would subjugate it to universal types (Deleuze and Guattari, 1995 [1987]). Hardt and Negri suggest that we must substitute or overcome the idea of identity by that of singularity, recognizing entities not by which category they subscribe to (identity) but by intrinsic self-organizing and internal structures (singularity). That applies to the broader ecosystem we inhabit, but also to our communities and ourselves: as persons participating in communities, we should not need to be classified in terms of universal types, but should be able to express our singularities.

To describe an entity as a metabolic cycle is to affirm its singularity and that of its context. A social institution is a metabolic cycle stabilized by its regulations that determine, to enough extent, the material fluxes that comprise it. The issue in this matter is transformation: to understand metadesign as the design of metamorphosis, of things that change over time, and to be able to deal with the consequences of the unstoppable passage of time.

[2] In this specific passage, I mention the word "Singularity" according to the currently notorious meaning of the "technological singularity" theory, which states that soon we won't be able to understand, much less cope with, the consequences of advanced computer technology (Vinge, 1993; Kurzweil, 2006). In all other parts of this paper, the term "singularity" means the singular aspects or qualities of an entity, which is different from its "identity", i.e. the aspects that would make it a representation of an abstract and presumably universal category.

Furthermore, thinking in terms of metabolic cycles takes into account that our natural environment is finite: in our planetary ecosystem, metabolic cycles can only transform the same amount of matter into different configurations.

Machines can be seen not as mere mechanical entities, but as abstract constructs that direct action through the integrated movement of myriad objects in their domain. Deleuze and Guattari (1995 [1987]) suggested that the whole of the human ecosystem could be considered a "mechanosphere", meaning that all socio-cultural activities take place in a complex and approximately stable configuration of material, cultural and technical fluxes. I have suggested that what we call an artist's "style" is an "abstract machine": the way an artist works is his or hers major creative object, comprising methods, recurrent schemes, specific material and objectual selections that have been organized into a stance towards creative work that results in the production of specific kinds of objects. We can see the organization of creative social games as the set up of a social machine that can entail concrete action in the city.

The configuration of these machines is also the work of the metadesigner, trying to configure social action not through direct command and control but by organizing certain interactive modes – by interfering in micro-macro interactions. Varkki George (2006 [1997]) has speculated, even if dubiously, that urban design is the action of metadesigning the city: the creation of "decision environments", on which society codifies the generally desired characteristics of a city, and afterwards that same society uses that "abstract machine" to direct the actual construction of the urban environment. If that sounds strange, we can rename those components and see that it's the recurrent way we have been doing urban planning all along: the "decision environment" comprise the set of urban regulations, zoning and occupation standards, building codes and usage legislation that's obligatorily taken into account in the design process of any actual urban development program, building or street furniture. And it is obvious that the construction of that "decision environment" can only be a heated political debate, generally done in a haphazard manner, and conducted by a closed and minimal social interaction repertoire – recurrently based on assemblies, consensus building, motions and elections: few people speak and many listen. People are increasingly open to a new set of social games that can change definitively what we call "urban planning" or "urban design" – based on open conversational configurations, such as the already popular "world café", an many other open collective practices, on which many people listen, but the same amount of people speak. There are many emergent "creative social machines", even if haphazardly conceived and operated. Metadesign can help map these machines, indicating specific and opportune points of action, inflection and interference.

A final aspect of reality building is that of *Meaning*: reality as valued perception – shared social values, memes, inventions, and images – the subjectively summarized intentionality. If we understand reality as a "useful fiction", constructed based upon meaning brought by perception, then aesthetics and meaning are the basic building blocks of reality: from a metadesign perspective, we should concentrate on articulating meaningful situations in which meaningful interactions would take place. And meaningful social interaction is mostly comprised by what happens in small communities and local connections in the relational space – what pertains to "savage thinking".

Savage thought, Instrumental thought

The long-standing belief that savagery is a primitive, and somehow incomplete, socio-cultural stance has been debunked by a series of twentieth-century anthropologists and philosophers: starting with the positing of "savage thought", by Claude Lévi-Strauss (1989 [1962]), then "savage politics", by Pierre Clastres (2003), and the conflicting dialogue between the civilized and the nomad (savage), by Gilles Deleuze and Félix Guattari (1987 [1980]) – to summarize their line of inquiry, the savage, or nomad, is not a more primitive state through which mankind has passed in its initial developmental phases, but is a quality of being, or becoming, that is alive in mankind right now. All sorts of preconceived views about savage societies abound regarding them as "lacking" civilized traits (such as government, the State, the market, currency, etc.) – Clastres and others have argued against such views, characterizing savage thought as a fundamental mode of being/becoming and making politics; besides that, the identification of savagery with the "primitive", "primeval", "incompetent", "brutal", and specially "violent", are all referents deriving from the (dubious) notion that civilized societies have "surpassed" this initial developmental stage through discipline, the necessary self-control and learning fundamental to the advancement of culture.

Savage thinking is characterized not by its end or usage, but by itself: the savage thinks in an untamed manner, for the sake of thinking, and it is embodied in life, not something theoretical in the sense of referring to an external plane of being. Civilized thinking, on the other hand, is characterized by the need to apply it to some end – it is a tamed, a "put-to-use" thought, justified by its usage or application: its motivation is always something external and/or transcendental – actualizing a presumed inescapable duality between the body and the soul. We could comprehend savage thought as an "embodied" or immanent mode of thinking and acting, and the civilized thought as a dualistic, transcendental mode of thinking divorced from action. But we prefer to refer to them as "savage" and "instrumental": savage thought is the inescapable feeling of belonging to the living moment, where and when meaning is phenomenologically perceived/created – it is the mode of thinking/acting that is characteristic of communal life, sustained by informal, or para-formal, quasi-formal communication; instrumental thought is the finalistic approach to life, working through dualities (theory/practice, mind/body, individual/environment, etc.), which requires ever more formal modes of communication, command and control – it is the mode of "thinking to conform action" characteristic of Statutory life, where meaning always seems to be elusive and outside the social-political complex of technology. Horkheimer and Adorno (1969) have identified "instrumental reason" as a problem to be overcome by critical reasoning. Morin (2005 [1990]) has denounced the "blindness" of the scientific establishment,

trying to reduce the inherently irreducible complexity of the world to "keys of knowledge", conceptual "black boxes", never to be questioned (opened, re-analyzed) again. So, in principle, according to these thinkers, instrumental or anti-complex thought should be abandoned in favor of another approach. My findings indicate that the most consequential approach should be to embrace the limits of instrumental reason, at the same time we maintain these limits inside our perceptual field: if we see "instruments of knowledge" not as all-encompassing, but as fallible, replaceable, and precarious devices, than we are no longer captives of universal or instrumental thought, we are free to utilize instrumental concepts as part of an incomplete set of "tools", as would say Deleuze and Guattari (1995 [1987]). In this way, we also avoid some kind of "complexity purism", an extreme of rigor that is, in fact, just another manifestation of transcendental thinking.

Regarding violence, it is something that is always present, being the spasmodic or ritual violence of the savage, or the controlled, hierarchical/abstract violence of the social contract fundamental to civilized societies (Lévy, 1998).

Even inside civilized societies communities construct meaning through constant communication embodied in savage thought: through gossip and the embodied communicated presence of one another. It is in this milieu that we construct/perceive what we consider to be more fundamentally "real". Even when we learn, through our parents, school teachers and friends, that we must conform to civilized authority, learn the aspects of large collectives productive capacities, and so forth, that appreciation is presented to us by means of embodiment, and not so much through abstract learning of formal principles.

On the other hand, instrumental thinking works through the formal construction of codified communication in the State constitution and laws, in organizations' formal rules and obligations – Deleuze and Guattari's work in "Thousand plateaus" invites us to regard any type of organization constituted by means of statutory regulation as a "State", regardless of its social size and/or national status. It was by means of the usage of, and submission to, formal and power-conveying communication that mankind has been able to aggregate such large societies as in modern Nation-States, and to direct their movements towards productive activities, especially in industrial societies and large-scale enterprises.

Probably, it has now become clear that the savage and the civilized are not mutually exclusive modes of social interaction, but are, in civilized societies, two very distinct levels of existence or becoming (*devenir*), most of the time operating in two types of situations that only imperfectly communicate with each other. The concept of "nomad science" versus "royal science" is very elucidating: singular, and therefore concrete, meanings are produced in the context of communities thinking savagely (nomad science); only afterwards can these meanings be captured, disciplined, reduced and bureaucratized into freely mobile documentation (royal science). In a sense, metadesigners should be able to "hack" royal science, and introduce deep meaning in implicit ways into creative social games that integrate savage and instrumental thought.

Quantity and quality

If changes in scale necessarily incur in changes in character, there is interference between two categories that traditionally are mutually exclusive, *quantity* and *quality*. But in fact, regarding micro-macro relations, as complexity amasses, it creates emergent traits that are completely inexistent in lower levels of abstraction – the State emerging from the community, for instance. But these levels of abstraction have specific thresholds that can sometimes be detected, affected and dealt with: we can not only identify what can happen inside each level, but we can also look for actions that can only be inflicted onto specific levels. One such level is that of "communities". The *community* has been an eluding concept for quite long, but Dunbar (1995) has established a correlation between human cognitive limits and the size of communities regarding reciprocal relations between individuals: social aggregates below 150 individuals, approximately (the so called "Dunbar's number"), display mutual support and fast influence between people. Is that a "community", where savage thought is prevailing? Above that number of people, a different kind of social dynamics must be put into place to stabilize a social aggregate, mostly based on formal communication. Larger social constructs, like the clan, nations, modern nation-states, and the globalized society of today are all based on more or less formal narratives accounting for the organizing cosmology of that society, which damp – but do not wipe out – the whirling dynamics of savagery; they will still survive in micro-scale communication. Here we find an association between levels of abstraction and levels of formalization: in communities, we are in a low level of abstraction (relatively few people), and we exercise communication at very low level of formalization – being gossip a good example; in large scale societies, we are at a high level of abstraction (people in large numbers), and we need to mediate social interaction with highly formalized communication – the founding social contract is a good example. In between those two levels of abstraction and formalization, we have lots of different scales, some displaying well-defined thresholds, some not.

Each level of abstraction (and formalization, since both are correlated in socio-cultural complexity) can produce a different kind of manifold, which can produce different kinds of cultural products – e.g. meanings, ideas, patents, ideology, narratives – but the research relating each of these through the different levels is still incomplete.[3] But regarding the extremes – elaborated by the duality community/savage versus State/instrumental thought –, we can indicate a complementary cosmology, articulating a new epistemic outlook that is bounded by our own contemporary cognitive limits.

Engagement with the savage mind is best be made through tangible actions, best presented by meaningful conversations mediated by informal notes, visually and

[3] The relation between manifold modes and social scale presented here is derived from observations done on field and consultancy work; therefore it is very speculative and somewhat anecdotal. The actual research work to correlate these two aspects is a task to be developed by numerous productions, planned for the future research.

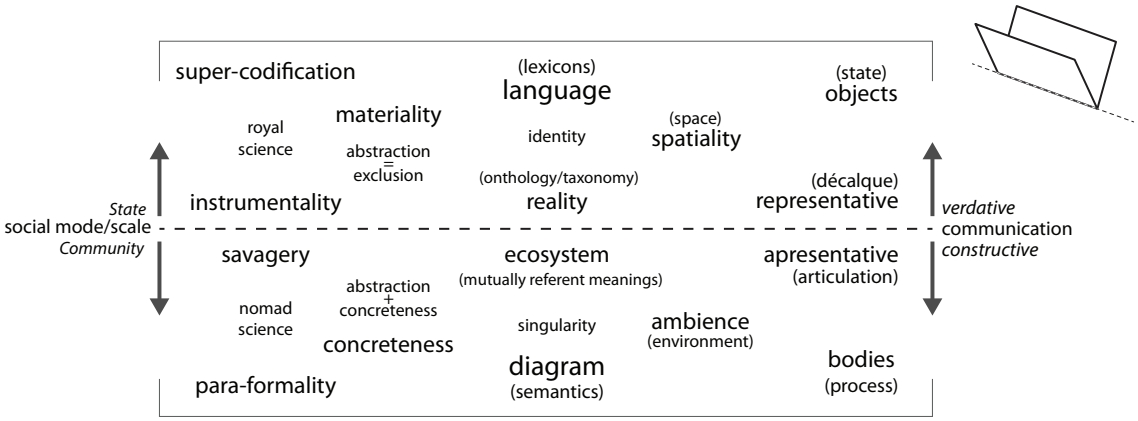

Figure 4. Aspects or qualities of the dialogue between "savage" and "instrumental" thinking. These aspects are not part of a table, but more of a constellation of concepts, reflected in one another: each aspect in the lower half of the diagram has a counterpart in the upper half. The lower half presents the aspects of the savage or nomad world, while the upper half refers to the civilized or sedentary world. Both co-exist today, but savage thinking is the inescapable substrate that entices reality to exist, while instrumental thinking can only exist supported by each counterpart in the lower, savage, half. A way to visualize this diagram is seeing each segment, lower or upper, as a mirror-image of its counterpart, like in folded piece of paper, the fold being the segmented middle-line: each aspect or quality would meet with its counterpart. Note: there are more aspects in this diagram than were discussed in the present paper.

collectively made diagrams, graphic and visual constructs (recurrently called "tools"), organized in specific *manifolds* and *machines* to maximize results. I interpret the contemporary "post-it mania" as the expression of a desperate, yet previously unheeded, need to collectively and dynamically arrange ideas in a diagrammatic form. Engagement with the instrumental mind is of course the bread and butter of institutional communication work, but it is being reconfigured to accommodate this new reality.

There is a growing repertoire of manifolds and social machines: the diagrammatic arrangements of people in the scale of communities to address the aspects of engagement, productive work, accountability and responsible action. In fact, I interpret this expanding and complexifying array of methods, games and procedures being heuristically developed as the expression of a not so clearly explicit intent to enable the community-scale, the savage mind, to speak more clearly and be better understood by the State-scale, the instrumental mind. Therefore, the opportunity brought by metadesign is to better articulate this growing repertoire, and not to rethink it, through a "clean-slate" methodology, that would set things right by the presumably correct application of scientific and philosophical work. On the contrary: to metadesign is to incorporate what's been heuristically and communally produced as *ad hoc* methods into a complex set of loosely, but rigorously, articulated tools. The issue, in metadesign work, is not of attaining formalized methods and or results, but of constructing viable and meaningful creative situations.

Co-creation games

Recently, there has been an upsurge in interest in community-driven innovation[4]: organizing communities in temporary initiatives to generate meaningful answers to clearly defined issues regarding those same communities. This self-observation and self-reconfiguration is an exemplary metadesign activity: an entity restructuring itself. Most of the time, practitioners and group coordinators that lead these projects aren't aware of this metadesigning quality of their actions – but they still end up using cognitive tools that are variations inside the four that I have mentioned earlier (diagram, abstraction, emergence, procedure). Even if we consider that innovation is a process substantiated not by public polls – and its myriad variations (such as the notorious "focus group") – but by the distributed exercise of creativity, it still needs to be grounded in the social context. This grounding cannot be in statistically constructed demands voiced by potential future users – since they cannot voice a need they cannot feel. So, in most cases, the self-entitled innovative organization develops an exercise of "social ventriloquism", projecting its own findings and proposals as "the voice of the target audience". But there is room for co-creation games that would honestly articulate the poietic process in a socially distributed way.

Innovation and art

Recently, the mistaken idea that innovation is something that can be ordered in a commoditized way has put enormous pressure on creative teams that are part of corporations, organizations and communities. To ease that pressure, lots of consultancies, advisors and theoretical material have come forward, trying to frame the perceived "obligation to innovate" in a productive approach. A recurrent aspect of these initiatives is to locate a clearly defined need, preferably originated in a specific community, interpret it as a "problem" (or "pain"), and consequently

[4] Some examples are the European Institute of Innovation and Technology (https://eit.europa.eu/tags/communities-driven-innovation), Yunus Social Business Global Initiatives (http://www.yunussb.com/), and so many consultancies specialized in promoting productive social gatherings.

derive from it a "solution": the much desired "innovation". This is a very naïve understanding of the innovation process for three reasons: (1) it puts the innovation process in a bounded context, excluding a much broader social ecosystem that has a more sophisticated spatio-temporal dynamic than can be found in "innovation sprints"; (2) consequently, approaches that supposedly drive innovation end up excluding an ample array of pre-formal, non-formal, para-formal and informal concepts (typical of the high-meaning, low-formality of the savage mind) that would allow to consider entities that do not fit in established taxonomies – symptomatically, the biggest difficulty in the aforementioned approaches is the recurrent eventual refusal of ideas that enter in conflict with the accepted identity of the innovation process's sponsor company or organization – that conflict being what's exactly expected from the actual innovation; (3) the idea that innovation is an "answer to a need" is the expression of modern societies' characteristic schizophrenic worldview (Bateson, 2000; Deleuze and Guattari, 1995 [1987]): the saying "necessity is the mother of invention" is an oxymoron, since, as is known in evolutionary biology – through the exclusion of Lamarckism –, an innovation can't be needed before it exists. An innovation is the result of a perceived opportunity, not of a problem or already articulated necessity.

One possible explanation of Art is the "ontological mobilization of reality":[5] it creates entities that, having no place in the established taxonomy and ontology (the philosophical "monster"), force us to change our notion of "what is real". This aspect has long been identified as the "educational" function of art and poetics, and has been deeply reinforced since the advent of what I call the "Romanticist-Positivistic Fracture": the modern invention of the sciences (by Positivism) and the promotion of the currently accepted notion of art (by Romanticism) – art and science became mutually exclusive concepts, despite several attempts on the opposite direction during the last two centuries. To overcome that Fracture, we'd need to re-include in Art's conceptual framework previously accepted and, in fact, inseparable aspects of poetics, such as what's called "technology" (according to positivistic epistemics), that's been divorced from art with a political agenda after a long pre-modern struggle between servile and liberal arts. But if we do overcome that Fracture, those two legislatively divorced aspects of socio-cultural life would again mingle: science would need to accept its own monstrosities (i.e. non-classifiable entities) and art would be back as a broader field, with direct practical consequences to social life. In that hypothetical socio-cultural context, there would be no difference between art and innovation: both are the disruptive introduction of "monsters" and "chimeras" in the urban-political ecosystem – both innovation and art change the configuration of relational spaces of culture and society, and irrevocably change the balance of political power in micro- and macro-contexts.

Paradoxically, this broader and more complex understanding of innovation is more powerful in its socio-political consequences, but is lighter and more playful in its organizational aspects: if we posit that innovation operates the same way as art, then we also need to change the way we organize and direct "innovation cycles" in organizations, enterprises and communities. In summary: innovative action needs to resemble more art practice. And art works by exploring and developing opportunities not by solving problems.

These opportunities can be laid-out by creative actions in many ways. But I have found that the incomplete but sufficient mapping of the relations between the existing socio-techno-political ecosystem and the changes put forward by the proposed innovation can be articulated in four fronts: (a) technology and methods – how does the innovation work? Being that in terms of material technology (semi-conductors, electricity, internal combustion, for instance), or procedural-organizational technology (methods, just-in-time production and distribution, digital fabrication, software and applications, for instance); (b) anthropology and the socio-cultural context – what are the images that populate people's minds regarding that aspect of their lives? That being aspirations, habits, manifolds, shared social-spaces, etc.; (c) financial and revenue models – how would the innovation sustain itself in the economy? Being that an aspect of direct/indirect payments, or the creation of perceived value; (d) aesthetics and ergonomics – how do people perceive and relate to the innovation? It can be a rigorous poetic-aesthetic consideration, or an embodied relation, materialized through ergonomics. These aspects are approximately enough to describe both the innovation and the ecosystem it will affect – and their mapping is also an application of metadesign's cognitive tools.

Metadesign and the distributed city

Metadesign can help reorganize this array of methods and cognitive tools that are dedicated to innovation – with special interest for the invention of new forms the urban context–, composing or adjusting manifolds, metabolic cycles and machines, and help create new meaning and contribute directly to a new urban-political dynamics.

A "city of fluxes" (Arantes and Braga, 2007) can only be expressed from a different epistemic than that inherited from the "Romanticist-Positivistic Fracture"; an urban community that is proficient in articulating *apresentations* and not only *representations*; an urban environment composed of singularities that are not required to conform to identities; a city that embraces the micro-scale of the community while still being operational in the macro-scale of statutory rule. A meta-city composed of *manifolds*: urban living spaces that cannot be simply reduced to territorial neighborhoods, buildings, or infrastructure, and have their overlapped socio-political aspects mapped out to public overview.

The "Distributed City" (Vassão, 2014) is a non-sectionable world-urban environment: a city that has no centralities (a *distributed* system) also does not conform to geographical subdivisions determined by territorial nation-states, and, through ubiquitous telecommunication, brings forth social spaces that extend into different regions, continents and geographies: the Distributed City is changing the nature, extension and dynamics of manifolds, making them world-

[5] This paragraph is a summarized exposition of the argument I present in another paper, interpreting innovation as a variation of the poetic or artistic process (Vassão, 2016).

wide entities. Thanks to today's fast and cheap telecom and transportation, people live in similar ways in very distant parts of the globe, entailing new micro-politics that clash with territorial localities: very *dissimilar* life styles are sharing increasingly close territorial companionship.

The complexity of such world-urbanity is of vast proportions, and traditional urbanism is poorly prepared to deal with this context. Metadesign can contribute to new urbanistic methods that do not subscribe themselves to Positivism, and therefore put universals into parenthesis, are based in concrete singularities that can only be elaborated through social co-creation games: the current urban communities' socio-cultural complexity makes it increasingly clear that there can be no *a priori* universals taken as immovable, immutable and invariant objects. These will be *dynamic* urban methods that surpass the prevailing epistemics by making it possible for the urban environment to become *mobile*, *flexible* and *changing*; not only in terms of mobile *entities* but also in terms of mobile *concepts* – being them ideas about the city and their citizens, but also legislative concepts and objects.

The material presented in this paper is a short summary of the research I have been conducting. But a substantial amount of work is required to derive these findings into concrete social machines that can promote the democratic development of the future city. Rigorously, this will be the facilitation of the urban environment's self-organization: a *metadesigning* activity – the unfolding of the here presented set of tools into concrete action through the organization of social co-creation games. The Distributed City creating itself.

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