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Article

CO-CREATING VALUE IN URBAN PUBLIC POLICY CONTEXT: A DIFFERENT APPROACH

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Abstract: Urban areas face daunting economic challenges that have increased in scope in recent years. At the same time, cities provide for opportunities for growth and value creation. The interplay of these challenges and opportunities represents the area of intervention for policymakers and researchers.

However, the traditional approach to urban policy, deriving from the managerial and economic policy theories, shows difficulties mainly related to the capacity to counterbalance the interests and expectations of a multitude of stakeholders participating to the value co-creation process and to bring all different components to synergically contribute to the sustainability of the system.

The Author proposes an innovative approach to urban public policy, by adopting the theoretical corpus of the Viable Systems Approach ("VSA"). Urban planning will be particularly analysed, as systemic components of urban areas, with the aim to investigate the decision-making processes for an integrated, efficient, effective and sustainable management of the territory as a multidimensional, multisectoral and multi-stakeholder entity.

By recovering different settings, the VSA intends the co-creation of value as the capacity of the viable systems to increase its surviving chances in its own context. The value derives, first of all, from the strategic decisions aimed at finding both dyadic and context consonance. Through its strategic decisions, the Governing Body of the territory develops a specific system as the overall synthesis of all possible systems organised within a specific area, identifying pattern of development agreed by the several stakeholders of the territory. In the dynamics of value co-creation in systemic multi-subjective organizations, where the level of complexity is particularly significant, the research for consonance among different stakeholders is particular important in order to achieve the most value for the territory. In this respect, the VSA may constitute a valid tool, helping to find the necessary capacities to imagine evolutionary paths towards new competencies.

Keywords: Sustainability; Value co-creation; Viable Systems Approach; Consonance; Urban and Territory development; Public Policy

1. Introduction

Urban areas face daunting economic challenges that have increased in scope in recent years. At the same time, cities provide for opportunities for growth and value creation. The interplay of these challenges and opportunities represents the area of intervention for policymakers and researchers.

Public policy issues within urban, social and environmental domains has been dealt with by many scholars, policy makers and practitioners, particularly for what concerns programs and policies related to smart and sustainable communities. However, the traditional approach to urban policy, deriving from the managerial and economic policy theories, shows difficulties mainly related to the capacity to counterbalance the interests and expectations of a multitude of stakeholders

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participating to the value co-creation process and to bring all different components to synergically contribute to the sustainability of the system.

The Author proposes an innovative approach to urban public policy, by adopting the theoretical corpus of the Viable Systems Approach ("VSA"). Such an Approach is considered particularly suitable in the case of complex problem scopes, when decision-makers need to consider diverse points of view and to contemporary analyse different contexts. In this paper, urban planning (including real estate assets, mobility, energy and accessibility) will be particularly analysed, as systemic components of urban areas, with the aim to investigate the decision-making processes for an integrated, efficient, effective and sustainable management of the territory as a multidimensional, multisectoral and multi-stakeholder entity. The territory is thus seen in its systemic dimension, abandoning the concept of the territory as a stationary space, empty and absent of evolutionary paths, and considering it as a dynamic system that nourishes the growth of generative high-value knowledge and becomes the platform of networks outwardly projected.

By recovering different settings, the VSA intends the creation of value as the capacity of the viable system to increase its surviving chances in its own environment, through the selection of the context made by the Governing Body (Barile, Gatti 2007). Consequently, the value derives, first of all, from the strategic decisions (decision making) aimed at finding both dyadic (with different supra-systems) and context consonance (Golinelli 2012). Under the VSA perspective, the creation of value for territorial areas mainly occurs through the creation of value for relevant supra-systems (citizens, businesses, not-for-profit organizations, etc.) living on it.

Through its strategic decisions, the Governing Body of the territory develops a specific system as the overall synthesis of all possible systems organised within a specific area, identifying pattern of development agreed by the several stakeholders of the territory (Barile 2012).

It is worth noting that, in case of territories, not only the system but also the Governing Body is characterized by a multitude of stakeholders, thus making less stable and cohesive the decision process to address the choices concerning the development of the system. This is why, from a systemic point of view, in the case of cities, it is more appropriate to speak about governance (as a systemic dynamic of government) rather than of government/management.

In the dynamics of value co-creation in systemic multi-subjective organizations (such as territories), where the level of complexity is particularly significant, the research for consonance among different stakeholders is particular important in order to achieve the most value for the territory. In this respect, the VSA may constitute a valid tool, helping to find the necessary capacities to imagine evolutionary paths towards new competencies (Barile 2009b).

2. Materials and Methods

2.1. The VSA fundamental paradigm

Before dwelling on the analysis at the basis of the paper, it seem appropriate to briefly recall some fundamental proposition to be placed on a priority basis of the theoretical corpus used for the purpose of the study: the Viable Systems Approach.

Two paradigms are particularly important and must be premised at our discourse, distinguishing between:

- ‘structure’ and ‘system’;
- ‘environment’ and ‘context’;
- ‘consonance’ and ‘resonance’.

According to the VSA, 'structure' means the composition of related elements and it is characterised by: i) the possibility of identifying a physical boundary between what belongs to it and what is foreign; ii) the possibility of attributing a specific function to each of the components; iii) the stability of direct or indirect connections between components; iv) the overall capacity of the structure in a behavioral dynamics, within which it is *pro tempore* focused on a complex of "related" components. The 'system' emerges from the structure and it is characterized by: i) the inconsistency of the physical boundaries as qualifying characteristic of the system, due to the inclusion of the bound itself into the system as the Governing Body takes it into account; ii) shift from function to role, which is defined by the strategy developed by the decision-maker (Government Body), oriented towards achieving a final objective, iii) the emphasis on relationships, even multi-components.

The distinction from environment to context is realized by the Governing Body which interprets the surrounding environment and derives a context in which the system can emerge and survive. In such a way, the Governing Body drives the organization through an evolutionary path that gradually reduces the emphasis on the single components in order to reach an overall entity capable of solving in a concrete way cross-cutting and specific issues that cannot be tackled beforehand (Barile, 2011b). According to the VSA, the Governing Body selects from the environment those systems that it considers prior (supra-systems) and, therefore, 'relevant', according to their criticality and influence[1]. With those systems the Governing Body searches for what the VSA defines 'systemic consonance'[2], interpreting the needs of individual organisations and pursuing the synergy of their evolutionary patterns. The viable system emerges from the activation of relationships with supra-systems which realizes, by interacting each other, the dynamics of the operational processes. According to the VSA, the context is no longer statically defined, as a predetermined background on which the system stands out, but it emerges from the hermeneutical and self-determination process carried out by the Governing Body, as a painter who, by filtering the world through his eyes, pours it on canvas. Form the same environment, therefore, several subjects can extract as many different contexts[3].

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[1] According to the VSA, 'subsystems' and 'supra-systems' exist only in the moment in which *the system collapse on the structure;* in other words, when the system is observed as a phenomenon by a third thinking subject, which interprets the reality through the variety of information in his possession and figures out the system, fixing it in a certain moment. To make an example, it is similar to when we look at a cartoon sticker and we freeze the image of our hero (the system) on the paper: we are ending it on the structures. It is worth noting that, when the Governing Body thinks strategically, he abstracts himself from the system, observing it as a third party. Whenever he reflects on the possible outcomes of a given situation, such exercise of conscience causes the observer to come out from the system that, as it is observed, collapses on the structure. In the abstraction exercise, the observer can identify supra-systems and subsystems. Supra and sub-systems are recognised, under both a structural and a systemic perspective, by looking at two components which make them 'relevant': 'criticality' and 'influence'.

[2] This is the potential compatibility between systems, given from the difference between their Information Varieties, in presence of the same amount of information. It can be expressed as: $C = (V_1 – V_2) / i$

[3] It is through intersecting series of inferences that the interpreter of a sign gradually develops more and more precisely. Peirce defines a "sign" as "something that stands for something (else) in some respect or other for somebody" Cfr. Hartshorne

The last fundamental distinction within the VSA theory regards the terms 'consonance' and 'resonance', where the first refers to the potential compatibility between systems and the second to components operating in a distinctive role for a single purpose (Nigro and Bassano, 2003). In other words, resonance is harmonious systemic interaction, whereas consonance is structural and relational (Barile, 2008).

Leveraging on these conceptual pillars, the transition between the structure and the system is similar to that from static to dynamic. Focus is shifted from related individual components to interrelations, according to a holistic and evolutionary view of the reality observed. More in detail, the VSA has highlighted eight steps through which the system emerges:

- *Business Idea* (BI): reflections on the fundamental idea that will characterize the future of the organization;
- *Maximum Design Scheme* (SOM): the design scheme which identifies the needs to satisfy (demand side);
- *Logic Structure* (SL): the axiomatic representation that can represent the design idea or programming, considering the use function (supply side);
- *Physical Structure* (SF): the materialization of the logical structure by identifying and qualifying the internal components which allow to effectively realize the logic structure (make choice);
- *Expanded structure* (SA): the complex of relations with external components which are needed to realize the logic structure (buy choice);
- *Defined Organizational Design* (SOM): the configuration of possible relationships and interactions between internal and external components, reaching a greater degree of detail;
- *Specific Structure* (SS): the path identified by the Governing Body to achieve the objectives pursued hic et nunc, that is "the spatially and temporally contingent forms in which a specific organization is manifested" (Biggiero, 1992);
- *Viable System*: as the path identified is traversed, the viable system emerges[4].

2. 2. Problem scope, decisions and consonance

The decision making dynamics cannot be studied independently from the economic, psychological and cultural needs of individuals and social groups who are actors of the decision itself. In each decision-making process that involves more than one person, the choices made by each affect those of the others. To take its decision the Governing Body needs to evaluate how a choice has repercussions and influence on others players, which are viable systems, having a definite degree of fulfilment, and holders of productive resources more or less critical and more or less decisive for the optimization of the process (supra-systems). In order to understand how to make such an evaluation, we firstly need to define the problem scope[5] in which the Governing Body and the relevant supra-systems are found to interact and in which, therefore, supra-systems are called to assess the decision proposed by the Governing Body. This is the context in which the Governing Body and the supra-systems are immersed and involves:

C.; Weiss P. (1960), pp. 247-9 and pp. 274-308. Such a definition emphasizes the triadic relationship between the sign, the object and interpreter.

[4] In accordance with the definition of organizations provided by Zappa as the "viable cell of the entire economic order" (ZAPPA G., 1957).

[5] Newell defines the problem space as "the rational activity in which people engage to solve a problem", which can be described in terms of "(1) a set of states of knowledge, (2) operators for changing one state into another, (3) constraints on applying operators and (4) control knowledge for deciding which operator to apply next" Cfr. NEWELL A. (1980).

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1. a need to be satisfied;
2. a problem to solve or a goal or set of goals to be pursued;
3. a decision-maker, qualified by a certain endowment of knowledge, that we define as the 'Information Variety'[6] of the decision-maker;
4. the methods or strategies through which the decision-maker intends to solve the problem or to achieve the goal or the set of goals pursued;
5. a number of supra-systems, which are 'critical' under a 'structural perspective' and thus 'relevant' for the decision maker[7], each of which is qualified by a certain Information Variety[8].

Once having identified the need on which the decision process hinges on, the decision maker shall qualify the problem space, by considering:

[6] In accordance with the VSA, the 'variety' of a system (individual, group or organization) is qualified by three dimensions: *i) outfit of information*, representing the quantitative knowledge expressed in terms of elementary information units; *ii) interpretative schemes*, that express the ways in which they are processed and enhanced (in this sense, the schemes result in a composition of subsets of basic information units, expressing the subject acting); *strong believes*, that constitute the system of values of a person, a group or an organization (expressing the subject being). See Barile S. (2005) and Barile S. (2008).

[7] According to the VSA, the '*intersystemic relevance*' is defined as the ability of the supra-system to condition the decision-maker, his decisions and his behavior and, therefore, its prospects for survival in a given context. Determining the degree of relevance is the result of a judgment of value delivered by the decision-maker with reference to the ability and probability of a supra-system to influence, impede or facilitate the development of a intersystemic relationship, in so far as it affects the resolution of the problem or the achievement of the goal identified by the decision-maker. According to such a definition, the relevance is qualified by two main attributes: the criticality of the resource held and supplied by the supra-system and the influence exercised or exercisable. *The 'criticality' of the resource refers to the 'structure'* and is given by a specific characters that attribute to a certain resource provided by a given supra-system a connotation of need for the implementation of the decision taken by the system (Barile, Nigro, Trunfio 2006); it derives from the assessment of the intensity of the use of a particular resource within the processes underlying the implementation of the decision proposed: under how many Specific Structures is the resource needed? *The 'influence' instead refers to the 'system'* and expresses the ability of a super-system to affect the degrees of freedom of the decision maker by projecting expectations and pressures. It is due to the characteristics attributed to the super-system and to the activation and evolution of the intersystemic relationship in a certain moment in action: Are there rules, constraints, control and sanctions that characterize a certain relation? How relevant is the cost of opportunity of interrupting the relation?
On the definition of the intersystemic relevance see in particular Esposito De Falco S., Vagnani S., Simoni M., Ricotta F., Gatti C. (2006), pp. 150-151. See also Barile S., Nigro C., Trunfio M. (2006) and Barile S. (2006).

[8] The proposed definition of problem space leverages on the approach of the study of problem solving elaborated within the information processing theory or Human Information Processing (HIP), in the field of cognitive psychology. See, in particular: Newell A., Shaw J.C., Simon H.A. (1960) and Newell A., Simon H.A. (1972).

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- *origin and nature of the decision problem*, interpreted as the occasions from which the need or opportunity to take a decision emerges, for example distinguishing between problems which origin form inappropriate goals rather than inappropriate performance[9];
- *characteristic of the decision*, focusing on the method and strategies adopted by the decision-maker, for example distinguishing between adaptation decisions (aimed at adapting the current assets to meet new needs without altering the structure of ongoing objectives) and innovation decisions (which lead to a change of goals, objectives and organizational policies) (Gore, 1962);
- *characteristics which are attributed to supra-systems*, having given expectations, 'degree of completion'[10] and 'intersystemic relevance'; in other words, as entities (stakeholders) within the context of the decision-maker, which are interested by the same problem scope and which are able to manifest expectations and to exert pressures, on the basis of their 'relevance', thus conditioning the decision-making process.

In the specific case of urban and territorial development, the *scope of the problem* may be defined as follow: "*make cities and human settlements inclusive, safe, resilient*[11] *and sustainable*" (UNECE, 2015) [12].

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[9] In accordance with Richards and Greenlaw (1966), the origin of the decision problems in organisations can be summarized as follows:

- Inappropriate goals, due to:
  - Changes in the internal or external conditions to the organization, or
  - Goals too easily or too hard to reach;
- Failure to achieve the objectives set (inappropriate performance), due to:
  - Performance not in accordance with regard to its objectives, or
  - Poor performance level to achieve the objectives set.

In the late fifties, Niles (1958) argues that the occasion to take a decision may derive from:

- observing deviations from the planned course of action;
- identifying supervening events from which it is likely that deviations or favorable or dangerous situations will originate;
- developing of new possibilities to obtain purposes through better or more effective means or to increase the value and breadth of the objectives.

[10] The 'degree of completion' of a system is given by *the degree of accomplishment along the process of structuring strong believes and general interpretative schemes*. This influences the organisation of the systemic components and relationships and the role of the Governing Body and, thus, determines the stability of the system. According to such an interpretation, the viable systems may be distinguished in: *embryonic, in the process of completion and complete*. The first of the three systemic categories envisaged - the embryonic systems - is characterized by the presence or, however, the clear formation of an operational structure and the simultaneous absence of a governing body. In the other two classes (in the process of completion and completed system) there are both the operating structure and a governing body, although with different intensity. To give an example, it is possible to think at the level of regulation of a society: while an embryonic system will have no rules, a system in the process of completion will have customs and general rules governing relationships and situations; completed systems, instead, will be governed by general and specific rules, ethical codes and regulatory authorities. In a complete system there are consolidated ways of reacting to certain situations, basing on shared believes and general schemes.

[11] In our opinion it is better to replace the term 'resilience' with the term 'antifragility'. Indeed, referred to the characteristics of bodies, 'resilience' means the ability to recover from or adjust to misfortune or changes, coming back to the same shape and substance at the end of the pressure deformation. Differently, '*antifragility*' is intended as the characteristic of a body *to be pliancy to changes, altering its conformation but not its identity*. This is also different form 'plasticity' which means the capacity of

This is a renewed urban governance paradigm aiming at promoting local democracy, participation and inclusion, transparency and accountability with a view to ensuring better urbanization and spatial quality, environmental sustainability, social and cultural development and economic prosperity. This final objective can then be broken down into a number of targets including for example:

- improving the *living and working conditions* of all segments of present and future society and at promoting social inclusion and cohesion;
- placing *culture at the heart of urban development* policy and planning, as an essential investment in the future;
- supporting and facilitating sustained and inclusive economic growth through the provision of *adequate infrastructure*, such as in particular ICT infrastructure, which is essential to convey information;
- providing a spatial framework for the protection and management of the *natural and built environment*;
- contributing to strengthening *environmental and social resilience* and to improving natural and environmental risk prevention and management[13].

Considering the Logic Structure, the VSA elects information as the independent variable of the system: the bricks through which our mind builds the interpretation of the realty. It is the flow which has to be *pro tempore* magnified. Basing on such an argument, urban planner shall provide the vital components of the territory with all the instruments and infrastructure needed to maximise the amount, quality and flows of information. Such can be identified as one of the main aim of the urban planner.

While having set the objectives, we need to properly design the urban development process. Considering the present time, such a process shows several failures, as focuses on the resolution of individual problems (concerning for example housing, transport, energy, social cohesion, etc.), while not looking at the territory as a multicomponent integrated system. Consequently, policy makers provide for individual strategies which are not able to enhance the role of each single systemic component, nor to significantly improve the capacity of the system overall to survive. In other words, the actions implemented seem not to be able to achieve the ambitious goals set of "inclusive, safe, resilient and sustainable" cities. The problem space of urban development mainly originates from this inability to define and implement integrated, complete and holistic strategies.

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a strained body of being melded or altered, never coming back to its previous identity. The difference between those concepts has been interestingly represented by Nassim Nicholas Taleb, authors of *The Black Swan* in 2007. In the vision of Taleb, the word is divided (such as all that's in it: people, things, institutions, ways of life) into three categories: the fragile, the robust and the antifragile. Antifragility allow organisation to cope with shocks and disruptions, leveraging on them to become stronger and more creative, better able to adapt to each new challenge to be faced. See Taleb N.N. (2008) and Taleb N.N. (2013).

[12] UNECE-Habitat, *Development and Implementation of the International Guidelines on Urban and Territorial Planning (IG-UTP)*, Remy Sietchiping, Urban Planning and Design Branch, Milan Expo 28 May 2015.

[13] All the mentioned objectives have been set in a space of consensus at international level such as the United Nations Economic Commission for Europe (UNECE).

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Obviously, providing for strategies pursuing specific individual goals is not wrong in absolute. Already in the Eighteenth century, Adam Smith said that «it is not from the benevolence of the butcher, the brewer, or the baker that we expect our dinner, but from their regard to their own interest» (Smith A., 1776). The problem of integrating urban strategies arises as different urban objectives (energy, transport, houses, etc.) moves along different directions, so that by pursuing one the system do not generate value also for the others. To better understand this point let us leverage on the service-dominant logic and service science[14], in particular on the co-creation of value scheme. But what is "value"? Commonly, people think at "value" as at a scalar quantity: an amount, a number. Using the VSA, we can propose a different concept of value, as a vector. Each vector (let's call it 'value-vector') has a specific magnitude, sense and direction. It is composed by a number of other vector and scalar components. If the value is a vector, when co-creating value, decision makers shall find the best way to positively combine all the value-vectors involved, each of which represent the final objective and the interest of given supra-systems. *When defining urban integrated strategies the policy decision makers shall, therefore, consider the combination of all the 'values-vectors' which can be co-created when pursuing the identified territorial goals*; he shall, in other words, look at how vectors (e.g. vector E: energy production and saving; vector T: mobility and accessibility; vector H: housing, etc.) combine each other to produce a new value-vector (W) representing the value that is co-created on – and for - the territory.

W= E+T+H

In our model, the sum of the value-vectors can be made by using the so-called *parallelogram rule*[15]: a pencil and straightedge construction rule which, however, is only applicable for vectors in Euclidean space, or for vectors in a curved space embedded in a Euclidean space of higher dimension. Getting back to the case of urban development, in order to design holistic strategies and to co-create value for the territory, the urban planner has to realign the objectives pursued and the expectations of the relevant supra-systems by combining the different value-vectors, in an incessant movement toward the achievement of its objectives. Within a unique space, interests are not competing[16] but can all contribute to the total value of the territory, as the pursuing of each of the existing goals also contributes to value co-creation for the others (e.g. the improvement of transport infrastructure in a suburban area entails the requalification of dismiss rail stations, contributing to the revitalisation of that area; consequently, more people will be interested in living there, using new residential spaced realised into barracks no longer used for institutional purposes, etc.).

[14] Those theories share a representation of the customer-supplier relationship conceived according to a new "service" approach, that redefines the traditional interpretation of the exchange of goods and services, leading it to a value co-creation scheme, according to which all the actors involved participate in the set of exchange interactions as resource-based integration on mutual value propositions. See in particular: Lusch R.F., Vargo S.L. and Wessels G. (2008); Maglio, P.P., Spohrer J. (2008a); Maglio, P.P., Spohrer, J. (2008b). Further interesting studies on the subject are: Golinelli, G.M., BARILE, S., Spohrer, J., Bassano, C. (2010); Barile S., Calabrese M., Iandolo F. (2012); Barile, S., Polese F. (2010).

[15] If two vectors acting simultaneously on a particle are represented in magnitude and direction by the two adjacent sides of a parallelogram drawn from a point, then their resultant is completely represented in magnitude and direction by the diagonal of that parallelogram drawn from that point.

[16] Using the value-vectors models, interests are competing only if they have same direction but opposite sense.

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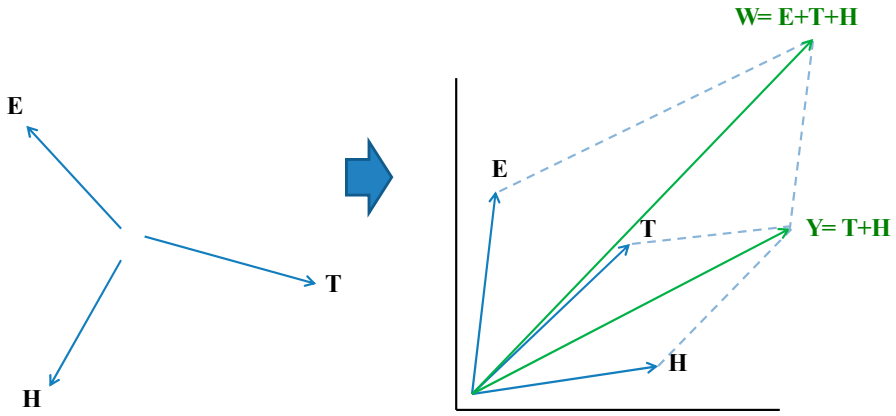
Figure 1 – Realignment of territorial objectives and value-vector combination



In order to lead back all value-vectors to a positive combination, what is needed is an innovative decision (*characteristic of the decision*), which leads to a new paradigm for urban and territorial planning. *This is more than a technical tool; it is an integrative decision-making process that must address various interests and be linked to a shared vision and an overall development strategy*, with the final aim to enhance the surviving capacity of the systemic components living in the territory and of the territorial system as a whole. It must combine several spatial, institutional and financial dimensions over a variety of time horizons and spatial scales[17], as a continuous and iterative process grounded in well-defined and enforceable regulations.

In order to identify the various value-vectors, we need to firstly recognise all the supra-systems which are 'relevant' when implementing the urban strategy. As we said, supra-systems are considered 'relevant' when they are both critical and influent, where criticality is related to the structural dimension (*function*), while influence to the systemic dimension (*role*)[18]. If we argue that, in

[17] Under the VSA, the time and space dimensions are concentrated into the 'information dimension', which is the information variety at a given moment. According to VSA, both time and space are representation of the information through which the mind (*intellectu*) conceives the reality. Time exists because the amount of information has changed from t_0 to t_1. This conception of time recalls the philosophical backbone that goes from St. Augustine to Einstein's relativity. According to the Augustinian lesson, time lives into the consciousness; as the conscience in action is 'present consciousness', other times are merely projections in the past or in the future (memory and wait) of that present consciousness. Time, therefore, exists only in thought but from thought is not definable except by relation, as a perception of changes: for Descartes it is the number of movement, for Hobbes the phantom of motion; Kant will define it as an *a priori* concept which refers, in different forms, to both the intuition (*Anschauung*) and the intellect (*Verstand*). According to Hegel, time is a sensible intuition of an external abstraction, consisting of elements that are characterized by their difference-exclusion. Heidegger will see in the future the prior dimension of time, which sums up continuity in the inevitable *Dasein* design. Bergson distinguishes between a mechanical time (time of science) and a time of consciousness. Along the thinking of all this philosophers, it is possible to envisage common basis: *time is an elusive element of reflective thought that is defined per relationem*: it is the number of change, order of ideas, succession of causes; *it is the image (the phantom would say Hobbes) of the change we can observe*.

[18] The attention to the *role*, when studying the behavior of organisations, takes the moves form the 'Situationalist theory', developed in the second half of the twentieth century. It includes two main fronts: *i)* approaches within the so-called 'political

urban context, function, task, assignment and role are aligned[19], the representation of the structure is sufficiently exhaustive, so that we can classify supra-systems (and identify relevant characteristics) only in term of their criticality, as follow:

- *institutional supra-system* (Public authorities at national and local level, Ministries, etc.), which hold financial resources, but also assets and infrastructure, and have the power to allow or block the development of the initiatives (authorisation power);
- *economic private supra-system* which hold the financial and technical resources to implement the initiatives and make pressure on the decision-maker in term of which project to be realised;
- *financial supra-system* (investors) which hold the financial resources needed to finance urban development projects;
- *social supra-system* which have expectation of a better quality of life and exercise their pressure through the instruments of democracy.

In order to develop an integrated, holistic and ecological strategy for urban areas, able to balance all the various interests on the area, urban planners shall provide for a systemic, and not only structural, representation of the reality, which is able to focus on the role of each component within the viable context. The systemic perspective shall be combined with the structural one, to provide for the alignment of urban interest represented as value-vectors. To describe the value-vectors space and pursue the alignment, innovative concept needs to be introduced, overcoming the traditional approach to the study of organisations: '*consonance*' and '*resonance*'. As already explained in paragraph II.I, the concept of consonance is closely related to the degree of integration between structures, or theirs compatibility, and can be described as "a sort of compatibility between systems, enabling them to synergically relate" (Golinelli, Gatti, 2000-2001). Resonance, instead, qualifies a systemic interaction capable of generating harmony between parties, resulting in a superior synthesis that transcends those manifested by individual systemic identities. It can be defined as "a sharing accompanied by

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model', mainly focused on the individuals, on the modes of aggregation, and hence on interaction dynamics inter and intra group; *ii)* the 'neo-institutionalist theory', focused on the study of institutions, of their construction / maintenance / destruction processes and of the pressures they exercise on subjects and organisations. The political model points to a micro-social perspective, within which the unit of analysis is the '*social actor*' (individual or collective), able to use behavioral strategies in its field of action (from cooperation to conflict) aimed at achieving its own interests.

Simulation is also linked to Constitutionalism, in the sense that the observer constructs the reality in any time through his interpretative activity and, in doing so, he restates himself, that is the very assumption of his future construction activity, in a perpetual dynamics of representation of the reality.

On the 'social actor' see in particular: Crozier M., Friedberg E. (1978); Friedberg E. (1994); Crespi F. (1999); Di Maggio J.-Powell W.W. (1991).

[19] For the sake of our discussion, we differentiate between function, assignment, task and role. The concept of '*function*' is related to the fulfilment of certain activities according to given schemes (instrumental and technical scope) and, hence, to the concept of *Logic Structure*. It is similar to the Aristotelian 'potentiality' and differentiate from the '*assignment*', conceived as a set of potential tasks and related to the *Extended Structure*. On one other side, the '*task*' is always qualified *hic et nunc*, at level of *Specific Structure;* while the *role* refers to actions carried out within a complex of interacting components and is reconnected to the *systemic* dimension. It is the Specific Structure in action, from which a dynamic behavior emerges.

It can be argued that the function, associated with each component, has fallen into individual behavioral dynamics in a particular role, deriving from the action strategy identified by the decision-maker, which has programmed a process of activity aimed at achieving an end.

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belonging and 'tuning', a progressive attenuation of the structural boundaries" (Golinelli, Gatti, 2000-2001). Basically where consonance is a potential match between the parts, resonance is the concretization of this potential compatibility in an operational collaboration addressed to achieve a common goal.

In territorial context, in which a multitude of stakeholders are involved (i.e. public authorities, investors, private economic and social operators), systemic resonance is a necessary condition for achieving urban development objective and has the pre-existence of structural consonance as a condition for its realization. The activation of a process by interacting systems and the consequent configuration of an unique system – synthesis, and not just, of the precedents – requires that such systems share orientations and prospects or are characterized by structural compatibility, on the basis of trust and consequent capability to link each other. By opposite, in case of context consonance gap, in which consonance among stakeholders continuously decrees, it grows the potential of disputes and inefficiencies.

The more or less functional relationship between the components of different systems is due to the consonance existing between them. Consonance, indeed, as a structural compatibility between systems, allows them to relate, join and where possible enter into resonance; resonance, on the other hand, qualifies a systemic interaction that, by causing the progressive narrowing of the structural boundaries between systems, creates a new systemic inclusive reality that includes and summarizes the starting systems.

A deeper description of the concept of consonance and resonance is provided by an extensive literature and in particular: Golinelli 2000-2002-2005; Golinelli, Gatti 2000-2001; Barile 2006-2008; Esposito De Falco, Gatti 2012.

Once having defined the major concepts of consonance and resonance, in the following paragraph we will depict a metric to measure the degree of consonance in urban contexts.

3. Discussion and Results

3.1 Metrics for the measurement of consonance

In order to measure the level of consonance between systems, we should refer to the overlapping and, therefore, the compatibility of the Information Varieties and / or systemic components that relate to each other. Therefore, we should first determine a model to represent such systems as Information Varieties. *The VSA uses complex mathematical entities, such as vectors, to represent Information Varieties and, as independent variable, the basic information unit*. According to such a representation, it is possible to define the Information Variety (therefore also "Variety" or "*V*") attributed to any vital system by the endowment of information $\Delta = \sum u_{i,k}$ and to identify three dimensions of such a Variety, each of one linearly based on a single unit of measurement that is the basic information unit (u_i). Those dimensions are:

- A *basic information endowment* (*ie*), representing the quantitative endowment of information units possessed by the vital system $\Delta = \sum u\ i, k$;

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- An array of *Interpretative Schemes* (*is*) (of basic information units), where the synthesis scheme is meant as the result from the composition of subsets of elementary information units;
- An array of *Strong Believes* (*sb*) (of Interpretative Schemes and information units), representing the ability (in terms of knowledge owned) to link elementary information units between them or with Interpretative Schemes.

We can therefore consider the following definition of Variety (V) of a Vital System as a vector:

$$V = (dv, ss, cr)$$

Let consider V_1 and V_2 as Varieties which have different amount of information u_1 and u_2 (with $u_1 < u_2$) possessed by two vital systems Sv_1 and Sv_2 in a given context.
According to the VSA, the consonance C between the Varieties of the two vital systems is defined as follows:

$$\lim_{u_1 \to u_2} \frac{v_1 - v_2}{u_1 - u_2} \equiv C \quad \text{and} \quad \text{therefore} \quad \frac{\partial v}{\partial u} = C \quad \text{(Barile, 2006)}$$

The measurement of consonance is thus given by the shifting of the Variety configuration (V) on the basis of the received information. For example, there will be consonance in the event that a limited amount of information exchanged will result in a significant shift of the Variety vector (like when at one glance everything is revealed). In other words, *if two Vital Systems S_1 and S_2, in their existential dynamics, record more and more contiguous Varieties by expanding their knowledge (acquiring information units), we can say that they are consonant. At the same time, if there is a positive progression of consonance as the two Systems exchange information, then there is resonance*. Resonance can be defined as follow:

$$\lim_{u_1 \to u_2} \frac{C_1 - C_2}{u_1 - u_2} \equiv R \quad \text{and} \quad \text{therefore} \quad \frac{\partial C}{\partial u} = R \quad \text{(Barile, 2006)}$$

When looking at consonance and resonance we are not looking at static dimensions. They stem from the variation of the matching of intents and aspirations between systems, as a result of the frequency of relations and quality of information exchanged.
The variation of consonance for the emergence effect of interaction between systems can be ascending or descending. Generally speaking, consonance increases in the presence of a progressive development of sharing, accompanied by a sense of identity and tuning, by a progressive weakening of the structural boundaries, with the achievement of higher levels of trust and the accordance of guidelines and perspectives between interacting systems. Instead, consonance decreases when the structural coupling conditions between the various systems fades over time, with the emergence of more and more disjoint and self-oriented relations and objectives.

The consonance between two or more systems cannot be assessed in theory, but needs to be plunged in the context in which the interacting systems will come to find a specific decision. Given a certain context, the Governing Body identifies supra-systems as different Information Varieties. As supra-system are both critical and influent, when designing and implementing its project, the Governing Bodies looks

for consonance and relevance with those supra-systems. He searches for the alignment of the relevant Information Varieties, by aligning the direction (convergence) of the 'Variety Vectors' (*V*) and thus decreasing the distance between the Information Varieties considered, in consequence to the immersion of the entities in common 'problem space'.

Leveraging on such theoretical premises, it is possible to qualify managerial models based on *a vectorial dynamic of the Variety*. One of the main issues consists in the identification of models and tools to assess consonance between systems. Although the VSA theorists has proposed different possible metrics for consonance measurement[20], the main front refers to profiling models, based on the tripartition of knowledge introduced by Audi[21], as well as on the Action Theory[22] and on the Action-oriented Representation Theory[23]. The profiling process allows providing a first consonance evaluation by defining clusters of Varieties, for example defined on the basis of the Jungian psychological types[24]. In the framework of the VSA, profiling becomes a research-oriented analysis of variables able to explain certain behaviors or, in general, of dependent variables which assume particular relevance in the processes of relationship among individuals. In order to assess a certain Variety, we need to measure the three dimensions of Information Unit, Interpretative Schemes and Strong Believes (Barile 2009a). While the Information Units and the Interpretative Schemes can be assessed by using Interpersonal Skills Questionnaires, more ambiguous is the valuation of Strong Believes, for which it is possible to use test for the assessment of individual valor orientation[25]. Once having gathered information through surveys, factorial analysis and analysis of the main components can lead to the definition of a number of clusters of Varieties[26]. At this point, consonance

[20] Esposito De Falco S., Vagnani S., Simoni M., Ricotta F., Gatti C. (2008), pp. 141-201.

[21] Audi R. (1998). See also the Logical Categories of Learning and Communication of Gregory Bateson.
Bateson, referring to the B. Russel and N. Whitehead Logic Type Theory, emphasized the presence of different degrees of abstraction in learning processes and made a distinction between the different logical levels of learning which may occur. Bateson G. (1999), *Steps to an Ecology of Mind. Collected essays in anthropology, psychiatry, evolution, and epistemology*, The University of Chicago Press, Chicago, (originally published 1972), pp. 1-565

[22] The Action theories focus on personal interaction, on the meanings that people give to their actions and on the social origin of these meanings.
The main reference of these theories is the work of the American social psychologist George Herbert Mead. However, already in the thought of Max Weber, they were present elements that have become central in the development of the theory. See, in particular, Mead G.H. (1934).

[23]«where, then, is the mind? It is indeed 'in the head' […]. But the flow of thoughts and the adaptive success of reason are now seen to depend on repeated and crucial interaction with external sources» Cfr. Clark A. (1997), p. 69. See also Clark A. (1991).

[24] The 'Psychological Types' were defined by Jung basing on functions of consciousness and attitude types and may be used to profile individuals with the aim of defining cluster of Varieties. For further details, see Jung C. G. (1976), *Collected Works of C.G. Jung, Volume 6: Psychological Types* (edited by Gerhard Adler & R. F.C. Hull), Princeton University Press, Princeton, NJ, pp. 1-640

[25] For example, it is possible to use the Value Orientation Test developed under the psychological science, which measures 8 Value Factors (Membership, Social Responsibility, Personality, Private Life, Quality, Intuition, Ambition, Status), particularly used to identify the individual value profile, to address the issue of orientation to the choice of a professional context.

[26] Basing on the common factors identified through this analysis, Barile identified macro-category of values as a composite result of the considered strong believes categories. These macro-categories represent specific typing (idealtypes) capable of

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between clusters may be assessed by looking at the dynamics of Varieties when receiving a flow of information. As for single Varieties, each cluster can be represented as a vector and consonance measured by the distance, which is the sine of the angle between the cluster vectors, which may increases or decreases with the growing of exchanged information.

3.2 The context of urban and territorial development: is there a gap of consonance?

The traditional approach to the governance of territory lies on the analysis of the individual parties of the area, interpreted as single components of a mechanism each one having a specific function. However, focusing on the *functioning* of the "machine", without taking into accounts the objectives pursued (*mission*) and the perspective of the decision-maker (*vision*) could significantly affect the success of the development project. *The emphasis shall be transferred to relations, intended as a protocol to obtain interaction between components*, with the awareness that a relation is also possible by using multiple connections. In this respect, it becomes important to activate resonance among relevant supra-systems, in order to design *integrated and intersectoral approaches to the government of territories*, that are able to address the diverse needs and to align value-vectors coexisting in a certain area.

With particular regard to urban development in developed economies, it is possible to argue the existence of a gap of 'ecological consonance'[27] among the viable system and the main involved supra-systems. Indeed, in the context of urban public policy, it seems to lack that sense of identity and tuning, the progressive weakening of the structural boundaries and the achievement of higher levels of trust and accordance on guidelines and perspectives which are hints of structural consonance between interacting viable systems. Private business operators express a lack of trust in the administrative procedures, respect of deadlines, effectiveness of the strategic processes carried out by public entities[28]. This makes them to perceive higher administrative costs when participating to a public-private partnership or other urban development projects. Respectively, public entities perceive the problem of stemming private operations in order to protect public interest as, for example, private managers may have attractiveness about adopting profit-making strategies or corporate practices that make essential goods or services unaffordable or unavailable to large segments of the population, thus showing a misalignment of perspectives and objectives[29]. By the opposite, a number of people, working for both public and private operators in the sector, may found a certain degree of consonance in pursuit their own personal economic interest; thus

characterizing certain value trends found in management approaches. Barile found six managerial idealtypes: Ethical conduct, successful thinking, sense of duty, focus on relationships, search for consensus, opportunistic orientation. BARILE S., Sancetta G., Saviano M (2015), *Management Volume I. Il modello sistemico e le decisioni manageriali*, Giappichelli Editore, Torino, IT, pp. XVIII-318.

[27] For the purpose of this paper, we refer to the 'ecological consonance', instead that to the general concept of 'consonance', as we want to include in our discussion all the number of connections and interrelations between the system and its context, thus considering also the impact of the given system. The paper strives for an eco-systemic view of the observed phenomena, under a future-oriented perspective which focuses on the evolutionary course of the system and on the value of its actions in the given context.

[28] According to the World Bank analysis, the *CPIA quality of public administration rating* progressively decreased in the last ten years. The same did the *CPIA transparency, accountability, and corruption in the public sector rating* in the last 5 years.

[29] Cfr. Goodman J.B. and Loveman G.W. (1991) ", pp. 26-28.

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contributing to the proliferation of corruption, particularly in public procurement procedures, urban planning and constructions permits[30]. According to the VSA, corruption indeed does not necessary means a lack of consonance among interacting systems, as it may lead to a sort of equilibrium in the view of the corrupting and corrupted organisations: it is just one of the possible emerging system form the given structure. So why do we say that corruption is not a desirable goal? To understand the phenomenon we need to put it in a broader viable system, that is what the VSA defines as 'context'; to think it over *not only holistically but also ecologically*. While indeed, under a holistic point of view, a corrupted system may be seen as a unique finalized system which function thanks to the action of all its components; instead, under an ecological perspective, it shows a number of negative connections and interrelations with the universe of actors and forces (*the context*) in which it is immersed[31], hampering the sustainability of the socio-economic system.

On the side of social organizations, citizens show different sentiments and behaviors as public assets are under public or private control. An empirical statistic research conducted on public vs private management of water utilities[32] revealed diverse attitudes of users, in term of individual water saving behavior, whether water provision was controlled by public rather than private operators. According to such a research, it seems that privatization of common goods may lead to lower willingness and attitude of users to cooperate. The same research showed that tariff reforms implemented by private companies attract much more attention to its profit making goals than in case of public management. Taking this data and adopting the VSA interpretative schemes, it is possible to argue, in general terms, the existence of higher consonance between citizens and public entities than between citizens and private entities. This may also be due to the differences in

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[30] In 2016, for example, according to the Corruption Perceptions Index measured by Transparency International, no country gets close to a perfect score. Over two-thirds of the 176 countries and territories in this year's index fall below the midpoint of the scale of 0 (highly corrupt) to 100 (very clean). The global average score is a paltry 43, indicating endemic corruption in the public sector. Top-scoring countries are far outnumbered by countries where citizens face the tangible impact of corruption on a daily basis.

[31] When we refer to *holistic* and *ecological*, we mean something slightly different. To better understand that difference we can use the example provided by the Austrian physicist Fritjof Capra: *Having a holistic view of a bicycle, for example, means understanding the interdependence of its parts and considering it as a unique, complete, and functioning entity. The ecological vision, on the other hand, "overcomes" the holistic nature by adding the perception of how the bike is placed in its natural and social environment: from where the raw materials are made, how it was built, how much its use affects the environment on the social system in which it is located, etc.* Cfr. Capra F. (1996), *The Web of Life: A New Scientific Understanding of Living Systems*, Anchor Books, New York, NY, p. 17.

We find this distinction between holistic and ecological widely reflected in the conceptual framework of the ASV, in which the relationship of the viable system with the supra-systems populating the selected context is of particular relevance. The term 'ecological' has been further deepened by the theorist of the philosophical school founded by the Norwegian Arne Naess in the early 1970s, who distinguished between *superficial ecology* and *deep ecology*. The former is anthropocentric and considers humans above Nature. The latter sees the world as a chained, network of interconnected and interdependent phenomena, as different threads of the immense plot of life. On the difference between superficial and deep ecology, see also Dalla Casa G. (2011), *L'ecologia profonda. Lineamenti per una nuova visione del mondo*, Mimesis, Milano, pp. 1-230.

It comes to our mind that, already in the second half of the sixteenth century, Galileo Galilei had said «*Things are united by invisible ties. You cannot catch a flower without disturbing a star*».

[32] Cfr. Kallis G., Ray I, Fulton J. and Mcmahon J.E. (2010), pp. 177–191.

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operation and perceptions that lie behind the concepts of "private" and "public", such as revenue and its distribution, trust, distance from the users, public access to decisions, accountability and *locus of control*[33].

At the same time, a lack of consonance seems to exist between the public decision-maker and the financial supra-system. In the present time, characterized by shortage of public resources and fiscal austerity (particularly in European countries), long-term investors have gained stronger importance to provide the financial resources required for the realization of urban development and infrastructure projects. However, at the present time, only in a few case long-term investors are involved in urban projects. This is mainly due to low returns of such kind of investments, uncertainty of legislation and lack of trust in the administrative procedures. Again, to be successfully captivated, a positive consonance among the investor, the owner of the infrastructure (public) and the manager of the activities implemented (public or private) needs to be found.

4. Conclusion

The approach to the urban and territorial development has been evolving, in the last years, toward more integrated, participated and holistic strategies and ecological attractions. Such approaches require decision-maker able to consider the territory under a systemic point of view - that is to say as a viable system full of systemic components-, focusing on the net of relationships with the relevant supra-systems. The viable-systemic manager, indeed, defines strategies able to underpin the context trend, as a weaver that, stemming from the available wires (context constraints), composes a canvas, trying to get closer to his abyss, continuing uninterruptedly to sew, without tearing. Through this path the result will always be given by the resultant of the series of vector forces acting in the context and will have the shape of a direction, a force attractor.

If a *consonance gap* exists between the participants when implementing an urban development project, *a realignment of views is needed in order to restore the level of consonance to acceptable levels and to reactivate the resonance for achieving common goals*. At the same time, an effort has to be made to bring the different dynamic of value-vectors pursued (e.g. energy, housing, transport, ICT, etc.) on a single vector plane, in order to positively improve the total value co-created on the territory.

Public private partnerships have tried to partially respond to the existing gap in consonance among operators involved in standard urban development projects, by including a new instrument which (in theory) might have been able to combine public and private endeavours toward a partaking of different interests in a common perspective. However the governance of projects has showed high level of complexity, due to the existence of a multitude of different cognitive schemes when delivering public investments through PPP schemes. Many hurdles are linked to the underlying investment projects (e.g. poorly prepared projects, delays/failure to obtain authorisations, poorly conducted public consultation processes) rather than to their delivery as PPP[34]. This, again, seems to hide a condition of resonance gap among involved operators.

[33] On the effect of the privatisation on citizens behaviours see Wolff G, Hallstein E. (2005).

[34] See European Investment Bank - EPEC, *Hurdles to PPP investments: A contribution to the Third Pillar of the Investment Plan for Europe*, November 2016.

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To conclude, when designing urban development strategies, the policy maker shall think strategically to the system, which will thus collapse on the Specific Structure[35]. In such a situation, the policy maker could primarily recognise the role of each component and consequently identify relevant supra-systems, which are both critical and influent for the delivery of the business idea. Then, he shall leverage on the analysis of needs and characteristics of such supra-systems in order to evaluate the level of resonance among those. In case of gap of consonance, he shall ideate *systemic solution with the aim to replace the resonance, addressing, at the same time, different demands and aligning the set of value-vectors and objectives to be pursued*.

On the basis of what we said, of a Viable System that collapses on its Specific Structure, in which the role and the interrelations between components are pivotal, *interesting further analysis may regard the dynamics of the systemic interactions in the evolutionary path of viable systems*. Traditionally, indeed, practitioners and scholars have considered the prospects for development through 'structural analysis', focusing on relationships and functions of the components, for example in terms of elasticity and resilience and matching possibility. In complex systems, instead, such as urban systems, we cannot leave apart the dynamics of interactions, which hinges on the specific structure and on the context, *hit et nunc*, in which the system is dynamically immersed.

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[35] According to the VSA theorist, the Specific Structure consists in the representation of the set of capabilities with which the evolutionary dynamics of the context is dealt with. At the level of the Specific Structure, it is possible to identify the role of each component, as the number of actions carried out within a complex of interactions.

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