Essay

Flexibility in City Planning: A Theoretical Approach

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Communication

Flexibility in City Planning: A Theoretical Approach

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Abstract

After approximately fifteen years of observation and research on the topic of flexibility applied to urban studies and urban planning, the paper focuses on a synthesis of the arguments developed. This text is not intended as an invitation to embrace flexibility either as a paradigmatic assumption or as a guiding principle for actions on the city. Rather, it should be regarded - more modestly - as a synthetic outcome of several lines of work the author pursued across three distinct experiences: (i) as a researcher, (ii) as a scientific consultant for public administrations in the preparation of planning documents, and (iii) as a local administrator. These three domains of activity have shaped the production (as author and co-author) of contributions belonging to three main categories: (a) scientific publications—articles in international and national journals, book chapters, and conference proceedings at both international and national level; (b) proposals for urban plans and environmental assessments at the municipal scale; (c) administrative acts with direct effects on land-use regulations and/or public utility. The approach to flexibility presented here unfolds across three domains:
A) the study of the city as a mutable and adaptive object. B) the urban plan as a tool of governance, assumed as an open instrument. C) a holistic approach to planning.

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1. Introduction

From the outset of the research trajectory that characterized the author work in the last fifteen years, a deliberate effort was made to maintain a close connection with urban phenomena, understood as the outcome of an iterative and intrinsically complex process that entails at least the following phases—not necessarily sequential:

- Analytical phase: analysis and diagnosis of the components of the urban system.
- Decision-making phase: definition of city planning objectives derived from the analyses and/or from the political program of the governing majority.
- Governance phase: management of the city through the implementation of the plan or through its amendment.

This process, which encompasses both the formulation of the urban plan and its implementation, involves multiple actors who: possess highly diversified knowledge and skills; operate within roles often clearly defined by the regulatory framework governing Public Authorities, yet sometimes overlapping in practice; and engage in a wide array of legitimate actions that largely depend on the size and institutional capacity of the entity under consideration.

The chosen scale of observation is the city, while the administrative level under scrutiny is the Municipality.

The focus of this work is the city plan, conceived as the unique legal instrument regulating and shaping land-use regimes as prescribed by law, here considered through the lens of flexibility: in its formulation, in the rationale underpinning its design, and in certain operational aspects. A flexible and sustainable city is conceived as one that can be easily reused and adapted to the changes of its citizens. In this context, new settlements are not intended to be rigidly predetermined; rather, they aim to be reoriented according to future needs. [1].

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The main three domains (A) the study of the city as a mutable and adaptive object; B) the urban plan as a tool of governance, understood as an open instrument; C) a holistic approach to planning) run through the different chapters of the paper and provide a key to interpretation for scholars interested in exploring the theme of flexibility in urban studies and in the planning and governance of the city. Both of these components—the formulation of a plan and the governance of the city—can be framed within a broader notion of the design process. Following Infussi [2],

Problems are constructed interactively, in relation to the specific context and during the design process (that can be called "problem setting"), with the consequent implications for the role of the professional, for the formulation of the objectives to be achieved, and for the choice of the means to be employed. Within this perspective, the definition of the problem is the outcome of the interaction among actors and constitutes an essential component of the design process.

2. General Approach

The flexible approach, considered as a line of inquiry, deals with concepts often reiterated by various scholars [3,4] concerning the robustness of urban plans in relation to the evolution of social dynamics. Contexts affected by phenomena of turbo-capitalism and by extensive and rapid urban transformations have provided tangible evidence of the gap between the city conceived and planned according to historical, social, and economic premises, and the frenzy of physical transformation driven by economic pressures, but also characterized by the pursuit of new forms of collective symbolism. These phenomena, partly endogenous and partly exogenous, rendered obsolete the assumptions upon which the plans themselves had been constructed.

In the face of developments that were disproportionate in scale and extremely rapid in time, urban plans were often overtaken by practice and by processes governed on a punctual rather than comprehensive basis, only to be recalibrated (or entirely rewritten) afterwards—primarily in order to adjust infrastructural systems and public services to a metropolitan or regional dimension.

Periods of strong economic momentum constitute tangible conditions that have led, and continue to lead, to a substantial modification of the social and functional structure of communities, and consequently also of their spatial and urban configuration.

A central question therefore emerged, which can be summarized as follows: Are urban planning instruments capable of adapting to the mutations of the socio-economic context and to the need for urban structures that are always different and new compared to what had been foreseen some time earlier? The answer does not concern only the typologies of plans adopted in different contexts (for instance: the structural and operational nature of plans, as opposed to the wide scale framework and the neighborhood/area masterplan), but rather involves an extensive spectrum of possible approaches to urban governance.

According to the economic developments in the post-globalization society, the necessity of transforming the physical city in a radical way by following some general objectives (dimensional and symbolic), while leaving to the market the design and modification of the non-primary components of the city. Curiosity toward these rather basic empirical observations has, over time, translated into an analysis of urban phenomena, through a perspective directed at the multiple trajectories that the city - understood as a complex system - can undertake. These trajectories are conceived within a dual representational notion: the first, pragmatic, depicted by the historical sequence of urban facts (transformations, new constructions, structural modifications related to technological systems and infrastructural services); the second, expressed in the urban plan understood as a "rule of governance" for the city, but also as a possible future design, as a vision of the city, as the expression of the will of the civitas (guided by a genuinely representative politics) to inhabit the best possible *urbs*.

The triad *urbs*, *civitas*, and *polis* is frequently employed throughout the text. Among the many existing references—especially the more recent ones—it is considered that the clearest descriptive approach can be found in the works of Marco Romano [5,6]. Particularly illuminating is also the definition attributed by Veca to the *civitas*, understood as a civil and moral community, pertaining to

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belonging and to the identity of citizenship (Veca S. in [7]), equating the *civitas* with the right of citizenship, which Romano himself in turn regards as inseparable from the ownership of a property within the city.

It is a common experience that technological progress, political, geographical, and socio-economic changes, as well as the accelerating pace of transformations, increasingly affect the demands of citizens upon the city and its characteristics. Since these pressures induce a change in the mode of response of both the citizenry and the city users, the city is required to demonstrate a considerable capacity for continuous adaptation to contingent situations [8].

3. Organic View

Urban planning as a discipline has continued to elaborate and integrate an increasingly complex regulatory apparatus, due to the intention of controlling, regulating, and coordinating urban development in detail, to the detriment of emerging processes of transformation: a dirigiste approach that is inadequate - neither in substance nor in method - to the needs of democratic coexistence and social interaction, especially in dense environments such as contemporary and future cities.

Hence, the opportunity emerges to conceive of the city as an organism capable of adapting to a changing system of needs, and of giving form to the new characteristics of contemporary society through processes and rules that must be renewed.

This adaptive process, which involves all dimensions of the city and of urban studies, can be synthesized by the term flexibility, definable as the capacity of the city to adjust its functions, its structure, and its operational rules according to socio-economic stimuli of varying magnitude and frequency, through a spatially and temporally flexible approach [8,9].

A system composed of “territory” and “governance apparatus” of this type possesses several capacities, among which: responding efficiently and rapidly to external pressures; adapting to the needs of the civitas and of the polis by incorporating the continuous flow of their demands (which change over time and space); improving development strategies; increasing ecosystem resilience thanks to the organization of its structure and its internal relationships; and ensuring the definition of regulatory-organizational levels that are less rigid, thus complementing spontaneous phenomena.

Modern urban sciences have grounded much of their legitimacy in the effectiveness of theoretical and technical tools for constructing forecasting scenarios. Studies on the complexity of society, and its irreducibility to reliable quantitative schemes, have weakened both the validity of the results of technicist approaches and the methods themselves.

Moreover, today’s uncertainty regarding the economic situation, and the “liquid” character of society [10], heavily affect the possibility of making forecasts in such a broad and global system. In fact, the phenomena linked to globalization (global market, global cities, and the diffusion of lifestyles tied to technological consumption) on the one hand enable the shared resolution of some problems and the achievement of common objectives, but on the other hand tend to destabilize established rules and practices, weakening the autonomy of social and economic policies of States and of individual actors. Consequently, the maintenance of social bonds is called into question (see, for instance, Bauman, Sennett, Cesareo). Globalization multiplies affiliations but weakens them; it increases knowledge but fragments it; it tends to unite elements in macro-systems while dividing their meanings and dissolving systems of reference.

The instability of boundary conditions and the speed of change in the overall set of needs of the population – that is not an isotropic element - are reflected in the city (understood as the place where the life and evolution of communities are concentrated), requiring from it the capacity to adapt in real time to the demands of citizens. Planning thus becomes a forecasting activity founded upon fields of uncertainty rather than upon solid bases [11,12].

Therefore, the main purpose of design disciplines - namely, the definition of future scenarios at different scales - appears to be significantly undermined in its prospects and procedural foundations. It thus becomes indispensable to study possible scenarios and the methods for implementing them.

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The question that arises is: which urban structure is capable of sustaining and withstanding scenarios that are different and mutable from one another? And which plan can be imagined for this structure? It requires the capacity to adapt to different external conditions (the global socio-economic context) and internal ones (the social and organizational scenario). The capacity for adaptation demonstrated by individuals in extreme or changing situations must also be reflected in the urban environment in which they live.

When speaking of adaptation, one refers to the capacity and the action that an individual or a group of individuals can undertake to modify themselves or to be able to modify (and improve) an environment according to their needs and intentions. The relationship between system and its environment is the basis of co-evolution, which defines the essential character of adaptation. Adaptation and evolution are typical elements of biological and ecological systems, which have long highlighted the relevance of their role with respect to urban studies (see, for example, the concepts of resilience, ecological planning, and environmental assessments).

Already in 1942 Sert had emphasized the organic nature of the city, just as Geddes had previously identified the city as a specific organ through which humankind is able to evolve. The theme was also central to other authors such as Cerdà, Poëte, Piccinato, and many others that is impossible to cite comprehensively. The organicist approach does not provide an absolute solution to urban problems, but constructs a system oriented toward the search for balance, a compromise among the various social issues that can be identified. Piccinato [13], in the strictly urbanistic sphere, indeed spoke of a plan that had to remain open in order to guarantee to the organism the possibility of confronting subsequent emergencies and further transformations.

On the other hand, in the face of a condition of continuous variability, the city is also valued for its permanences: the very construction of the city, as Choay [14] affirms, is an anthropogenetic fact, and the city defines itself in the permanent relationship between urbs and civitas (and polis), where, however, forms and types of places associated with the urbsevolve over time. At the same time, the civitas and the polis influence the physical dimension of the city, provided that the economic resources for this to occur are adequately directed. The image that best represents the relationship between civitas, urbs and polis, and local identity, is defined by the “territorial principle” of Magnaghi and of the territorialist school, who see in active citizenship a fundamental role in the characterization of the places and spaces of the community [15,16]. It must be underlined that polis and civitas represent exclusively an act of will, which, in order to become real, requires concrete instruments.

With reference to Mumford [17], the city is recognized as the most complete human expression, since its primary function appears to be that of transforming the physical element into cultural and social element through action.

In this context, flexibility is defined as the capacity of the city to adjust its functions, its structure, and its operational rules according to socio-economic pressures of varying magnitude and frequency [8,18].

The flexible city, therefore, finds its meaning in the balance between variable or temporary elements and permanences imbued with civic or symbolic significance.

4. Reasons in Favor of a Non-Deterministic Approach

The definition of the city as a complex entity derives from the studies of various authors and has been addressed for several years [19–21]: complexity depends on the number of components of the system, on the articulation of their interactions, on the nature of the latter, and on their topology.

As is well known, the functioning of the city shows a high sensitivity to anthropic pressures and to environmental values: due to the complex nature of the system, punctual and apparently isolated actions may cause significant changes at a global level. Furthermore, the pressures exerted by humans on the urban ecosystem dominate the dynamics of the ecosystem itself at the planetary scale.

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Flexibility, understood as the capacity for adaptation and evolution that seeks to maintain—even dynamically—an equilibrium with the context, becomes a fundamental element from the scale of the building organism to that of the block and up to the entire urban and territorial settlement.

The city can therefore be interpreted as a complex dynamic system, that is, a system that emerges over time in a coherent form, that adapts and organizes itself without any singular entity intended to deliberately manage or control it [22], and that is capable of self-organizing through active social practices that identify public utility at the very moment in which it becomes a necessity. One may speak of a flexible city in the presence of urban structures composed of fixed elements, on which structural components are based, and variable elements that identify their continuous capacity for change and modifiability according to future perspectives and new needs.

1.1. The City as a Mutable Object

That the city constitutes the locus of temporal changes in society and its material manifestations is incontrovertible. More interesting is to emphasize how the pace of change in the socio-economic fabric is in continuous acceleration. At the same time, considering urban planning as an evolving discipline constructed upon concrete and spatial facts defined by a multiplicity of individual and social actions, it emerges that both the object of study and the epistemological nature of the study itself represent a reality that is highly mutable as well as complex.

On the holistic definition of the study and design of the city, there has been a great debate for at least three decades, by reason of the profound transformations undergone by the rules of organization of activities, of values, of the flows of circulation of people, of the forms of sociability, of the ways of using places, of the interconnection among regions, geographies, processes, and among planes of rationality. In short, the culture of design is confronted with transformations that are changing the physics of the habitat no less than the values and expectations of design [23].

Considering social time, the time of urban transformations, and the expected (or desired, planned) time for those transformations, one observes a substantial misalignment between the ways of living space (initially dictated by the rhythms of commerce, and today by the hyper-accelerated activities of digital technologies) and its inertia to change, imposed by strictly material and procedural reasons (bureaucratized regulation). Hence arises a permanent condition of inadequacy between the physical component of the city (*urbs*) and the social one (*civitas*) [8].

The changes we are able to observe directly, and those to which we bear witness indirectly, affect urban realities in different ways, generating specific urban uses and configurations. Nevertheless, it is necessary to acquire a transversal capacity of interpretation of what is happening or what could occur in the future (near or distant) in the absence of targeted actions [24].

Expanding the temporal spectrum to a historical perspective, Romano teaches that the *urbs* is the outcome of the self-representational will of the *civitas* [25], and therefore that this inadequacy constitutes the fertile ground upon which citizenship over time cultivates a space more suited to its needs, desires, and aspirations.

Many authors in different times (among them, for example, Lynch) underlined the necessity of the multidimensional and multitemporal representation of the city: as if it were an architecture, the city is a construction in space, an artifact that is possible only over long periods of time, and urban design is therefore a temporal art.

Today the population appears fragmented into increasingly numerous strata and groups, at the same time bearers of diversified interests. It is evident that not all may influence urban dynamics; nevertheless, due to the component of non-linearity, when moments of instability occur, even minor actors may generate substantial effects, and disturbance—even if minimal—may have an amplified impact upon the entire system [26].

In the urban context, multiple temporal scales operate simultaneously. The configuration and infrastructural system of the city adapt more slowly compared to changes in economic and social functions: it does not always happen that a city manages to adapt when subjected to successive waves of innovation [27].

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Urban challenges must necessarily take into account the innumerable and diverse so-called "non-human" factors, which may be described as any other species, material, issue, technology, or entity distinguishable from humans insofar as artificial or connected to the natural environment, in whole or in part, either at a given moment or permanently [28–31].

Urban form, in accordance with an organizational logic not necessarily coincident with physical space, is no longer recognizable through any demarcation line, tending increasingly to become a programming of the use of time.

1.2. Desired City vs. Real City

Cities define a systemic ensemble of communities, including both those with a precise geographical localization and those that do not have one. A plethora of stakeholders acts upon the communities, and their diverse interests heavily influence the diversity factor [32].

In the European legislative framework it is often emphasized that the good effectiveness of a policy depends on the quality of information and on the informed participation of the public. This implies a better efficiency of the entire system of local administrations together with its effectiveness thanks to the possession and use of information.

From the technocratic imprint [33] to the evolution toward a strategic orientation [34], the urban plan has increasingly tended to optimize the effectiveness and efficiency of territorial governance at different scales.

From a substantive point of view, from first- to latest-generation plans [3], in addition to the regulation of rent and the pursuit of the public interest, plan contents have shifted from a development/expansion perspective to one of reorganization and regeneration.

The general master plan, which is an instrument of fundamental importance for the development of local communities, over time has accumulated broad and diversified theoretical and operational objectives and contents, which have rendered it ever less suited to effectively guiding the transformation of the territory. Expectations regarding the plan have grown without its being assigned a more prominent role within the institutional process. For example, as is well known, the diverse "programs of public works" (that are different nation by nation, region by region, city by city) must reflect the plan's provisions regarding public facilities, but it is equally well known how this parallelism is disregarded in administrative practice. Plan implementation, which consists in territorial governance, is entrusted to a cascading system of plans and programs that economic and social dynamics render ineffective; should they be understood as flexible elements, they may be more capable of adapting to socio-economic changes and to the shifting collective and individual objectives of citizens.

Moccia [35] has defined clearly and concisely the principal objectives of plans as support to administrative decision-making: "Decision support is articulated according to the following strands: a) formulate hypotheses for forecasting trends in urban transformations; b) translate objectives into urban techniques (such as zoning and technical norms); c) facilitate and guide the decision-making process even when a multiplicity of actors is involved; d) have techniques available to evaluate […] alternatives also according to the multiple interests of complex societies; d) foresee the impacts of the actions decided." (Moccia, 2021, p. 56, translation from Italian by the author).

Subsequently, the same author brings closer the various perspectives of plans: "[...] the more one strives to bring strategy closer to tactics and to projects of whatever kind they may be, the more the quality of projects improves in terms of coherence and effectiveness, requisites to which strategic thought is directed. Conversely, if we distance them, then strategy moves toward aestheticizing visions abstracted from the complex conditions usually described by SWOT Analysis, and projects lose the verification of efficiency" (Moccia, ibid., p. 57).

The plan is the outcome of the process of defining a desired future that struggles to find a real translation both because of the very nature of the city (due to its complexity, the subject of the following paragraph) and because of the structure of the plan itself, despite various attempts to render it more appropriate and operational.

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1.3. Complex Systems, Self-Organization, Uncertainty, Fuzziness

A set of elements interconnected and interacting among themselves is called a system. If the interactions are not linear, the system is complex [36]. The city is a complex system [37] in which self-organizing phenomena generate surprise [38].

Portugali [39,40] has provided a very convincing formulation of the urban system as a complex system, describing it as composed of "artificial components" and "urban agents." The "artificial components" are extremely predictable, calculable, and definable with respect to the smallest element. As for the "urban agents," by contrast, predictability is limited and difficult to calculate. The "urban agents," thanks to their capacity for interaction (among themselves, with the artificial components of the city, and with the environment), are able to transform the urban system into a complex system of artificial cities.

The behavior of "urban agents" modifies the physical city (an artificial element) into the city that everyone knows and lives. Indeed, every urban agent is viewed as a planner at a certain scale, and, due to the property of non-linearity that characterizes the city as a complex system, it often happens that the planning or design action of a single non-expert—whether an "urban agent," planner, or designer—dominates the city much more than plans and projects outlined by professional urbanists [40].

Complexity has been useful for conceptualizing a variety of phenomena relevant to planning.

One of the principal complex objects that scholars have addressed are cities [41–44]. This may be attributable, in part, to the intrinsic importance of cities, being the living and working environment of over half the world's population and the principal generators and recipients of global complexity; in part, to the fact that the city—being perceived as a territorial entity with its own history and with specific characteristics that may remain generally unchanged for rather long periods of time—is an appropriate scale level of reference for understanding various spatial processes through complexity [45].

When referring to non-social complex systems such as natural ecosystems, the two principal dimensions of complexity are space and time; when referring instead to social complex systems, the human factor is an additional dimension to be studied [46]. Indeed, it is human action that largely defines the dual complex nature of cities [21,47]: the city as a whole behaves as a complex system, but each human being, a part of this city, is also a complex system with adaptive, self-organizing behavior. Whereas atoms and molecules may be described solely by their position in space, each human being must be described by a series of additional characteristics that play a role in their complex behavior, such as thoughts, intentions, culture, social and political norms, institutions, knowledge, and political interests [40].

Urban complexity resides not only in the three elements—humans, space (as we have defined it for cities), and time—but also in the way these elements are organized. If one imagines the city as a multi-level system with a semi-lattice structure [48], there are many levels of subsystems of different spatio-temporal scales, capable of interacting vertically, horizontally, and laterally.

Complexity, in design discourse, is still a vague concept and has been used as a literal term, stripped of its scientific dimensions. De Roo, drawing a parallel between the fuzzy understanding of sustainability in planning and that of complexity, argues that while the fuzziness of sustainability influences actions and behavior in planning, complexity influences our understanding of planning [11].

By combining socio-spatial complexity with such an understanding of planning, we may conclude that planning as a process and as a technical activity faces many challenges that require a sequential understanding and processing of a series of complex "presents" in order to approach the desired future(s) [49].

Urban problems are almost always linked to strong uncertainties: they are difficult to formulate in advance in a coherent and concise manner because their understanding and their resolution are often overlapping, intertwined, and even concomitant; they always present themselves in a complex form; they are often ill-defined a priori and may lack a well-defined structure. Cities are complex and

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fundamentally uncertain objects, and urban planning is constantly called upon to confront such types of problems.

With regard to decision-making under conditions of uncertainty, and considering cities as both object and subject of the process itself, it is useful to distinguish two principal situations. First, local public decision-makers (the public administration) may find themselves under conditions of uncertainty. Second, all private actors (citizens, operators, professionals, stakeholders, etc.) who act and live in cities may have to make decisions under conditions of uncertainty. However, the condition of public decision-makers is doubly complicated: they must deal with the uncertainty of the decision itself (stemming from the fact that urban systems are complex, dynamic, evolutionary, and, to a large extent, unpredictable) and they must make decisions to mitigate (or at least not increase) the uncertainty of citizens [12].

Public decision-makers regulate the actions of citizens, professionals, and stakeholders—that is, they intervene directly upon decision-making freedom (urban standards and land-use designations are a clear example) in relation to the creation or transformation of areas and constructions. Regulating private actions clearly shows two different decision issues: (i) how to reduce uncertainty during institutional planning, and (ii) how to reduce the uncertainty of urban actors in relation to the different plan scales.

From an evolutionary perspective, the point is not to attempt to invent and continuously create new basic rules, but rather to recognize and improve those basic rules that have successfully evolved over long periods of time and have demonstrated their capacity to promote social, cultural, economic, and spatial benefits [50].

Decision-makers should generally prefer rules that are primarily negative: that is, to prohibit certain negative externalities rather than prescribe specific actions. The formulation of positive obligations requires much more technical and regulatory knowledge than that needed simply to establish negative rules [51].

Uncertainty is a key concept in the planning process [20,42,52,53]. The non-linear evolution of spatial processes is in itself sufficient to imply the uncertainties involved in their development trajectories. Moreover, it can be understood that a complete comprehension of present and past and a perfect projection and construction of the future are practically impossible, especially when potential contingencies or disturbance elements are also considered.

As Skrimizea et al. affirm, the intrinsic uncertainties of planning can be connected to two types of “unknowability” (direct consequences of complexity in planning): the unknowability of the system as it is, and the unknowability of the effects of (planning) intervention [49].

This means that it is very difficult to achieve absolute knowledge of the system and, even if achieved, uncertainty remains as to how the system may evolve with or without deliberate intervention.

What should the objectives of planning be today and, more importantly, who can guarantee that they will still represent an adequate state for the city of the future?

Considering the example of the sustainable city, sustainability could be perceived as the ever-evolving space of alternatives or pathways along which one wishes a system to evolve, to guarantee its livability over time [54,55]. Such an approach to sustainability means that it is difficult, in the first place, to specify the optimal outcome, and that the trajectory followed toward the objective becomes more important than the objective [56].

Uncertainty is a fundamental component of the decision-making process and, as such, must be considered in the management of environmental resources. Uncertainty may derive from incomplete information regarding a given problem or from ill-informed judgments by those responsible for decisions.

A comprehensive approach to the analysis of the decision-making process must be able to consider the uncertainties involved in the various elements of the process itself and, moreover, how these uncertainties influence decisions. A wide variety of approaches - such as sensitivity analysis,

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fuzzy decision analysis, and Monte Carlo selection methods - have demonstrated the capacity to manage uncertainty in environmental decision problems.

5. Flexible Approach to Urban Studies

In this paragraph reference is made to the "method or mental attitude or particular perspective with which the study of a problem is approached" with respect to flexibility. I refer to a flexible approach, and not to an approach to flexibility, insofar as in urban studies - which are frequented by scholars of different backgrounds and in which quantitative and qualitative methods merge seamlessly - it is necessary that the urbanist possess a form of holistic knowledge that allows for identifying the technique or methodology most suited to the variety of themes and problems encountered (from data analysis to the interpretation of phenomena, to support for choices, to instruments of expert and non-expert communication).

This holistic knowledge may be interpreted as multidisciplinary, interdisciplinary, or transdisciplinary. I underscore the interdisciplinary aspect: can such knowledge avoid the conceptual distortions linked to the specificity of each discipline's approach? And, above all, does it simplify reality?

To answer the first question, one may say that interdisciplinarity is sufficient to seek coherence among different forms of knowledge produced by different disciplines: for example, between geographers who establish a relationship between mobility behavior and urban development, and psychologists who establish a link between urban morphology and behavior in urban contexts. According to this logic, synthesis is possible, and its ultimate objective is a single form of knowledge, which generally rests upon a substantially interactive theoretical approach (borrowing the definition from psychology).

The answer to the second question is that interdisciplinarity also plays a role in the simplification of knowledge, whereas complexity can be addressed only through transdisciplinary science [55].

An urbanist will attribute the legibility of a city to its physical characteristics, a sociologist will attribute it to the different meanings linked to individuals' lived experience in the city, and a psychologist will pay attention to individuals' behavior in space. How can these different levels of reality (physical, sociological, behavioral) be articulated in order to understand how cognitive representations of the city are constructed?

According to the interdisciplinary model, the notion of social legibility provides an answer through a combination of the first two levels or of the last two levels. The integration of all three levels leads to rising above the integrative approach of interdisciplinarity by seeking the impact of each level on its relationship with the other two [57]. We define this approach as "mixed research." We could position "mixed research" between, on the one hand, quantitative research and, on the other, qualitative research, with the intention of fully respecting the wisdom of both these points of view while also seeking a workable intermediate solution for many problems of interest. Today, the primary philosophy of "mixed research" is that of pragmatism [58]. Mixed-methods research is, in general, an approach to knowledge (theory and practice) that attempts to consider multiple points of view, perspectives, positions (always including the viewpoints of qualitative and quantitative research).

"Mixed research," in its recent history in the social and behavioral or human sciences, was born with researchers and methodologists who believed that qualitative and quantitative points of view and methods were useful for addressing their research questions. For the first roughly sixty years of the twentieth century, "mixed research" can be seen in the work of cultural anthropologists and, in particular, of sociologists including Gans, 1963; Hollingshead, 1949; Jahoda, Lazarsfeld, & Zeisel, 1931/2003; Lynd & Lynd, 1929/1959 [59–62].

Although mixed-methods research is not new, it possesses characteristics that fit perfectly with the flexible approach.

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6. Conclusions

In the last decades of the history of the city and of urbanistic and architectural proposals, several options have emerged for a flexible city.

To cite a recent example, edge cities represent a form of adaptation, although they cannot exactly be defined as a positive phenomenon. The edge city is probably the most complete expression of the concept of the Instant City hypothesized in the 1970s by Archigram [63]. It is, however, clear that the prevailing character of the Instant City, which exploits already existing infrastructural opportunities, is parasitism. It is an opportunistic settlement that consumes resources and land and that can also, slowly or as rapidly as it was created, shift its activities, leaving irreversible traces.

The answer cannot be entrusted exclusively to the delocalizing and anti-spatial approach, according to which the physical megalopolis must be contrasted with the "fluid city", a city dominated by the presence of telematic means, not physically identifiable, and defined as a union of contacts without physical limits.

What can guarantee the flexibility of the city is the soundness of its structural framework. So it was for Manhattan, which maintained the orthogonal grid while transforming itself in the third dimension. This is what is proposed in the Plug-in City, again by Archigram: a pure megastructure to which parts of the city are plugged in and unplugged. The structure of the city, by definition, is not a defined space or place. The current that best probed the problem of structure and, at the same time, the form of the city understood in evolutionary terms is Japanese Metabolism of the 1960s, which produced, through the work of Kenzo Tange, an idea of development for Tokyo on the bay, founded on a linear mobility structure (with reminiscences of Kahn in Philadelphia and, further back, of Soria y Mata), alongside which the metropolis could grow in blocks akin to cellular automata.

6.1. Nature of Flexible Choices and Time Horizons

As previously described, cities have become sprawling and universally plural entities with complex relational dynamics that make them difficult to map, trace, and coordinate. They are increasingly constructed and redesigned through relational dynamics. They are indissolubly linked to global processes over which they have little control, exposed to transnational flows of a spatial, virtual, symbolic, and material kind.

Urban planners must intervene effectively in an urban system oriented toward novelty and surprise, built upon a network of connections and flows with multiple nodes of authority and authorizing capacity. Independent expertise on the ensemble of imminent or potential vulnerabilities is necessary. To act in a complex environment in order to preserve the open and inclusive city is in part a matter of building social bonds, and in part a matter of enrolling non-human infrastructure for this purpose [64].

For the reasons described above, the flexible city must therefore be based on a strong structural scheme, founded on the anthropogenetic elements indicated by Choay and on Magnaghi's territorial principles, upon which operational elements can be modified, adapting to changing socio-economic and governance conditions.

Thus, within a framework of structural and operational plan, the planning contents of the operational phase linked to major urban transformations must be defined from a perspective of flexibility. First of all, an implementation plan for the adaptive city must contain within itself the elements that allow it to be modified without subsequent compatibility problems arising; it is a temporary configuration, of which, however, the duration is unknown. To this end, and to guarantee maximum transparency in public–private relations, the following must be defined:

- the public need or, alternatively, the quantification of public necessities;
- the maximum urban load, which depends on the capacity of the (overall) infrastructural system, existing and integrable or upgradable;
- to the urban load there must be associated a maximum urbanistic index usable on a one-off basis within a broad time span (indicatively 10 years, the typical duration of an urban planning

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agreement); the development right is conceived as the possibility of reaching the maximum urban load and not as an obligation to do so;

- the definition of a minimum urbanistic index that guarantees the economic balance of the operation (this can be done only after a preliminary assessment of land conditions has been carried out and following the submission of certified and detailed economic–financial statements);
- the definition of an incremental index to cover temporal uncertainties deriving from bureaucratic and political timing, to which a social benefit proportional to the efficiency of the public system should correspond;
- the definition of functional requirements and functional incompatibilities dictated by environmental or health and hygiene regulations;
- the definition of the temporary use of areas awaiting transformation (for example, by leasing land and/or buildings to companies producing renewable energy), with a benefit distributed between the public and the private [65].

6.2. What Kind of Norms?

Considering two types of regulatory approach, the teleocratic and the nomocratic [51], pragmatically these differ by the different degree of freedom they allow the citizen.
The teleocratic approach tends to see rules as instruments for directly pursuing substantive ends, mechanisms capable of leading us in a straight line to the desired result, whereas the nomocratic approach considers rules as devices that must guarantee the 'meta-coordination' of individual actions guided by the most disparate ends. Norms do not directly solve problems but create the conditions for solutions to be sought [51].
Nomocratic norms are therefore abstract norms, which identify an objective but not the means to reach it. They are certainly more liberal norms than teleocratic ones.

An example at the urban scale and over historical times consists in the theory of the aesthetics of the city [5], according to which the expressive freedom of citizens - who have the right to erect their own house and to modify it - aims at an overall embellishment of the city. The norms that could guarantee these results would certainly be nomocratic; those that today almost all municipalities adopt for landscape protection are clearly teleocratic.

Once again, the central theme turns out to be the protection of the public interest: if Romano is right (and judging by current European cities there seem to be many reasons to believe in his long-term vision), what reason is there to limit the creativity of the civitas with rigid and prescriptive norms? The history of modern urban planning would have us respond immediately that the reason lies in the need to curb rent. And that would be more than sufficient.

There is, however, a middle way, which I would call flexible, that can be constructed around a relatively simple principle: once the quantities and performances that fall within the public interest (and their possible variations over the lifetime of an urban plan) have been identified; once the maximum limits of density, height, and site coverage have been defined for environmental and landscape reasons; and once the functions incompatible with the context have been clarified—then the private party is provided with clear collective objectives and performance criteria, compliance with which allows design modalities to be considered free. I consider it impossible to foresee such a radical shift through the simple renewal of an urban plan, but I think that an experiment—perhaps in limited and calibrated spaces—could be interesting to test the receptiveness of a regulatory framework based on these principles.

6.3. Performance-Based Approach

In recent years, disciplinary reflection has shifted attention from an essentially quantitative approach to a performance-based and qualitative approach. Despite the invitation of some scholars to embrace the concept of a dimensional 'threshold' as a guarantee for correct sizing of public services and a rebalance between central and peripheral areas inspired by the criteria of spatial justice [66] the

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conviction - already present in Jane Jacobs' The Death and Life of Great American Cities [67] - is spreading that concentration is not a value in itself, and that its principal advantage lies in fostering social diversification, the commingling of interpersonal human preferences, the intensification of informal and spontaneous relations, the mixité of uses and activities, the transmission of practical knowledge [68]. These different declensions of density point to a notion of 'urban intensity' that must be guaranteed at different scales, and that includes the values of urbanity and diversity [69]. This meaning of density also makes possible a more flexible approach to the different temporal dimensions (hourly, daily, annual) of the city and, consequently, the adoption of urban policies more readily adaptable to differing needs.

As a simple example, in Italy, in the Lombardy Region law this concept has been regulated through the introduction of qualitative parameters for services corresponding to quality, usability, accessibility. Moreover, Lombardy Region unified the concept of service on a strictly performance basis; indeed, services include both public interventions and private ones for public use (in essence, under agreement). Another relevant aspect, still linked to services, which has become common parlance, is the concept of the intangible service. The latter fully represents the concept of the performance-based approach in that it requires (at first glance) neither physical space nor a specific location but provides a contribution in spheres tied to the public interest commensurate with the quality of the professional service delivered.

Another field in which this approach has been practiced for quite some time is the environmental one. Alongside standardized measures (such as the creation of green areas or the remediation of contaminated sites), new implementation modalities are asserting themselves that produce the same effects but do not rigidly determine the specific action so much as the result that it must deliver. A simple example concerns energy efficiency improvement, for which the owner (or owners) is free to intervene on the building envelope and on the energy infrastructure, provided that certain levels of performance improvement are achieved.

A contrary example consists of prescriptive building regulations for historic centers, which are often extended to properties of uncertain architectural or landscape value but of an age such as to fall under some form of constraint. Professional associations have long favored a performance-based rather than a prescriptive approach, also due to the objective difficulty of the responsible public entities (the Superintendencies) in handling the reviews of all projects.

The flexible city can only embrace the performance-based approach which, moreover, allows the introduction of technological innovations that would be precluded under a prescriptive regulatory framework.

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