



HAL
open science

Urban Planning: An ‘Undisciplined’ Discipline?

Daniel Pinson D. Pinson

► **To cite this version:**

Daniel Pinson D. Pinson. Urban Planning: An ‘Undisciplined’ Discipline?. *Futures*, 2004, Transdisciplinarity, 36 (4), p. 503-513. 10.1016/j.futures.2003.10.008 . hal-00789207

HAL Id: hal-00789207

<https://hal.science/hal-00789207v1>

Submitted on 3 Mar 2015

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L’archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d’enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Version auteur en anglais de « L'urbanisme, une discipline indisciplinée ? »,
Revue par J R Lawrence, Université de Genève et parue dans :
"Futures" 36, Vol. 36, Issue 4, (mai 2004), Special Issue of FUTURES on Transdisciplinarity
(Roderick Lawrence & Carole Després, Eds), Elsevier, London, p. 503-513.

Urban Planning : An 'Undisciplined' Discipline ?

Daniel Pinson

CIRTA (Centre Interdisciplinaire de recherche sur les Territoires et leur Aménagement),
Institut d'Aménagement Régional, Université de Droit, d'Economie et des Sciences d'Aix-
Marseille, France

Abstract

The need to cross disciplinary boundaries appeared in scientific research at least twenty years ago. Since its foundation, at the beginning of the 20th Century, urban planning has been claiming the assets of multidisciplinary. It is particularly concerned with transgressing disciplinary boundaries. However, multidisciplinary may weaken urban planning as a discipline, because it is a recent knowledge domain that has borrowed without questioning from the knowledge acquired in both the social and engineering sciences. Urban planning may forget to formulate an inventory and to build its own theoretical and practical assets. This article argues that it is only when a discipline has acquired its own identity that it can implement a fertile transdisciplinarity contribution.

Keywords : epistemology, urban planning, multidisciplinary, transdisciplinarity, fundamental and applied sciences

Introduction : Urban Planning is a « multidisciplinary discipline »

Transgressing disciplinary boundaries in research appeared, not less than about twenty years ago, as a blatant requirement of modern science. However, this approach has a long history as illustrated by Thomas Kuhn by the incursion of the physician Dalton into chemistry at the beginning of 20th Century [1]. This approach was considered as an intolerable audacity until recent decades.

As far as urban planning is concerned, the shift of all sorts of problematic towards urban issues by the human and social sciences increasingly associates both practising urban planners and researchers, with the specialists of other knowledge. Thus today, it is very difficult for urban planners to ignore the numerous approaches developed by other disciplines. In general, urban planners and researchers are open minded to interdisciplinarity, even though they usually graduated in a precise discipline. Those that have crossed disciplinary boundaries, have frequently been integrated in a multidisciplinary team. Therefore, their initial academic training contributes to urban planning practices, and it also nourishes theoretical debate. A double friction, within the multidisciplinary team often occurs. On the one hand, by the exchange with other disciplines dealing with urban issues; on the other hand, urban planners are required to better define the foundations and the originality of their domain. This preoccupation should concern those teaching and researching within this discipline.

If this work is not realised, then urban planning, (which is not recognised as an autonomous

discipline despite the pretensions of its founders) could disappear as quickly as it appeared. Therefore, it would be reduced to the surreptitious emergence of an intellectual and professional lobby that tried unsuccessfully, during the 20th century, to give itself a scientific foundation just as the exact sciences realised in their domain.

It would be regrettable if urban planning followed too closely other mature sciences, because it would then only refer to the theoretical and methodological frames of these well established disciplines. If team work constitutes an excellent occasion to learn from these disciplines, it is also a unique opportunity for urban planning to emancipate itself, so that it can further the construction of its own identity.

These subjects are discussed in this article. First, the article considers the explicit multidisciplinary position which characterises urban planning since it was founded at the end of 19th Century. Then the article will discuss the difficulty of being a "**multidisciplinary discipline**". Indeed, this viewpoint implies a double requirement during collaboration with other domains of knowledge. First, it requires an accurate appropriation of what is discovered in other fields; second, it requires an up-to-date identification of what constitutes the city. In essence, the city is the core of urban planning and what makes urban planning original in its perspective and its contribution to knowledge production.

Overcoming Contradictions : Towards a « multidisciplinary discipline »

Modern urban planning has been characterised by interdisciplinarity since it was founded at the end of 19th Century. Since then, academic and professional disciplines have established and split themselves into two groups: the phenomenon sciences, on the one side, and the spiritual (*numen*) sciences, on the other. With Kant's benediction, this distinction separated science and non-science in a world in which human knowledge had been mixed [2]. Consequently, architecture and urban planning split from engineering following tensions during a conflict with civil engineers. Then, urban planning differentiated itself from architecture by admitting social inquiry influenced by Le Play and his heirs of the Social Museum in France, and by Patrick Geddes in Britain.

The compelling rise of the Modern Movement (between 1928 and 1957) practically defeated (but not in theory) the interdisciplinarity of urban planning. However, since its foundation modern urban planning used to consider interdisciplinarity as a widely admitted principle and its analysis did not compete with those of the established disciplines. During the years 1928-1957, urban planning was - almost - the only discipline to pay attention to the city. Until 1975, the city was of little interest to the established disciplines, such as geography, sociology and history, except for contribution of The Chicago School of Sociology.

Today, the complex subject of human settlements is not attributed only to urban planning. Therefore, urban planning must overcome a contradiction. On the one hand, this contradiction stems from a multidisciplinary interpretation of the city which endeavours to comprehend the diversity of this « object of nature and subject of culture » as Lévi Strauss defined the city [3]. On the other hand, the contradiction concerns the construction of a disciplinary identity that struggles with its definition because the multidisciplinary principle shows this identity as an absurd

viewpoint. The theory of urban planning will have to explicitly deal with this contradiction by considering « excluded third parties » [4] a central idea of a « multidisciplinary discipline », which is particularly relevant for urban planning.

This idea may seem conventional to those who consider that the end of the disciplines and the time for transversal themes has arrived. However this article argues that there will always remain a way of tackling viewpoints and knowledge by starting with specific disciplinary theoretical and methodological approaches. According to Kuhn [1], an idea can obtain widespread acceptance if it nourishes contributions that help to confirm and clarify disciplinary approaches.

The disciplines, as specific domains of knowledge, are indeed loosely defined sets, which a certain positivist concept of science attempted to fix with epistemological "ruptures" (Bachelard) and "cuts " (Althusser). However, this vision of science, inspired by the evolution of physics until Kant encouraged the separation between the natural and the social sciences, has not always helped scientific constructions, especially of the humanities and other domains of knowledge taking part in the so called "liberal arts"[2,5].

Urban planning should not establish a rigid corpus of immutable knowledge. Instead it should formulate and apply a methodology to create a set of unique capacities based on the relevant borrowings and specific achievements of diverse contributions.

Contributing to the Production of a Specific set of Knowledge open to other Domains

Urban planning can be considered in terms of three criteria which define the existence of a discipline. These criteria are: first, a specific set of knowledge and know-how; second a training system that allows this knowledge and know-how to be transmitted; and third, a professional organization that participates in applying this knowledge and in ensuring its recognition. Based on these three criteria, urban planning is a discipline within the field of urban issues just as medicine lies within the much broader field of sanitation and health. Research on urban issues calls for a better understanding of territorial dynamics, and of experimental projects and actions in the city. In this respect, urban planning owes its existence as much to theories issued from the practice of urban planning as to the academic construction of knowledge that can be placed effectively and deliberately within this field.

Until recently, urban planners often assumed the role of the "*mouche du coche*" for other professionals and researchers in diverse disciplines. Today, this situation has begun to change because the status of the city in national territorial planning and in international agreements has changed radically. Many disciplines now provide invaluable contributions that improve information and knowledge about cities, while highlighting the specificity of urban agglomerations and the limitations of urban planning in practice.

In well established disciplines (such as geography, economics and sociology), there is a large potential for diverse contributions, that remain within the framework of disciplinary fields, in spite of incentives for interdisciplinary collaboration. In the shadow of these contributions, specific knowledge for urban planning has developed through history, and probably before the

French word «urbanisme» [6] first appeared in 1910. These contributions constitute a patrimony, a volume of really important assets for the construction of the identity of those who deal with urban issues. Although these contributions were formulated by those not only interested in understanding the city, but also in transforming it, the authors have also made an important contribution to universal knowledge

The knowledge of urban agglomerations is essential to the practice of urban planning. This knowledge is concerned with «urbanization» and especially the spatial organization of urban development. This subject is also of interest to geography. However, in addition to sharing with geography this «object» of knowledge (as being understood by the positive sciences) urban planning is also defined as a discipline having an unquestioned relation with architecture and civil engineering, and as a professional activity (*praxis – action vs. poïesis – production*) aimed at mastering urban development, by subjecting the transformation processes of the built environment into configurations that will better serve society. Hence, urban planning has a normative role: it starts with the scientific study of urban spaces by highlighting their dynamics and trends. In addition, urban planning proposes projects that are simulation-tested. Today, it is not sufficient for these projects to be functionally and technically feasible because they also have to be socially acceptable and ecologically sustainable.

Consequently, a body of doctrines and theories has been formulated in urban planning not only to comprehend urbanization processes but also to conceive human-made objects. This body of knowledge and know-how shares common ground with other kinds of knowledge. However, it separates itself from them when the goals are not exactly the same. Today, a body of knowledge and know-how actually exists in urban planning. Moreover, it continues to enrich itself. It partakes of an accumulated ensemble of empirical research and theoretical constructs which are the common background of the discipline, produced by the discipline without preventing others from using this background [7]¹.

In the future, the key question is not to establish if the contributions meet the standards of a science (which differ from a non-science), but to see how a specific contribution adds something to current knowledge about human settlements, and their production from a specific point of view. The small part of «ideology» [8] pillorying any contribution is out of place. Today, it is often admitted that the field of knowledge, which involves the human being, is characterised by the uncertainty inherent in the intelligence and freedom of the «*homo erraticus*» [9]. Consequently, contributions may induce analysis and statements which cannot be repeated without a minimum of critical vigilance and adaptation of the methods of the so called «hard» or «exact» sciences.

The Inventory of the Patrimony: The need for epistemological work

Given that urban planners have been trained in miscellaneous disciplines, they have not always been concerned with inventorying those elements which justify a new branch of shared

¹ Let us quote only one work : "The Image of the city" by Kevin Lynch. It is, doubtless, one of the best examples of this reference literature, used by other disciplines, such as geography. However geographers do not exploit all the aspects, especially the practice of urban composition founded on the «imageability» of the city.

knowledge and which may be a common ground for all those concerned by urban issues. This shortcoming is regrettable given that urban planners stress the multidisciplinary nature of their work, while they co-operate with experts from other domains, and they often consider themselves to be specialists only in the discipline they initially studied.

The multidisciplinary quality of urban planning appears, does not seem achievable by individuals. Only working groups of urban planning actions seem to guarantee multidisciplinary. Indeed, the breadth of the mobilised knowledge in the planning practice demonstrates that it is not sensible for one single person to hold this immense body of knowledge. However, there is another way to interpret multidisciplinary, which does not exclude specialization at all. This is precisely by transdisciplinarity: being open to other disciplinary knowledge and know-how. Transdisciplinary approaches can rework specialised knowledge in order to readdress urban issues in a pertinent way. Among urban planners each is more or less an economist, or an engineer, or a sociologist, or an architect, or a lawyer contributing efficiently and relevantly to a common construction of the inventory of urban planning theory.

Without doubt, the formulation of this inventory requires an undeniable effort of «self awareness». How can one succeed without checking the literature and the realisations which punctuate this inventory, and list the achievements, or the assets and failures, or the overlaps, while raising questions? Research in urban planning should contribute to this inventory. Urban planners are in an excellent position to offer relevant and original interpretations concerning all sets of themes. They can identify what renders their contributions unique and essential.

The task of identifying and inventorying, requires in-depth epistemological work, like the contribution of Françoise Choay in 1965 [8]. This contribution provides the opportunity for urban planning to situate itself, and to measure the evolution of a discipline which has significantly been renewing itself for almost fifty years now. The credit of Choay's contribution (which doubtless had a greater impact in France than in the Anglo-Saxon countries) is to have re-evaluated a memory of modern urban planning since its origin, by favouring the rediscovery of trends, which has been forgotten, largely owing to the hegemony of the functionalist urban planning, embodied by Le Corbusier.

Meanwhile, since Choay denounced the ideological character and the illusory scientific ambition of urban planning, she applied a scientific conception aligned with the positive vision inherited from 19th Century. Prigogine's thoughts [10], developed after those of Monod in 1970 [11], shook this conception by cultivating suspicion about domains of knowledge in which human beings and society were introduced to a greater or lesser degree. Even framed by some structure, human freedom did not lead to the precise definition of immutable « laws », as far the human domain is concerned. The so called « exact » sciences began to realise what they owed to the laboratory setting [2].

Uncertainty became the regime of the new sciences [12] and, within this context, urban planning was considered without these suspicions which disqualified it from the positive science point of view. The teleological aim (in opposition to the objectivity that characterises fundamental research) was also challenged, and the multidisciplinary character, which refutes the

disciplinary purity of the « real » sciences was questioned. Today, another step in epistemological research should be taken in order to help the urban planning field to construct itself as a multidisciplinary discipline. Then, urban planning will have an up-to-date « tradition », and a corpus of re-organised references that will provide a benchmark for the renewal of urban planning reflections and practices [13].

Since the beginnings of urban planning, one can consider that « the science of city maps », became an accumulated field of competence, thanks to an intense transdisciplinarity curiosity, that enables specific urban projects to be better informed, of the contexts and the conditions of their implementations, and above all, of the consistency of the expectations of the targeted population. In the first instance, the contributions of architecture, engineering and medicine were complemented by the expert appraisal of geographers, economists and sociologists. Then the contributions of political scientists and ecologists followed. Urban planning is no longer a solitary artefact, locked in the autism of its technical performance. It is put to the test of economics and of the political relevancy of its programme planning, as well as its public reception and its daily use, within an organisation of initiatives that closely mixes public and private initiatives.

The functionalist trend issued from the urban planning of the Charter of Athens [14] and its four main functions (living, working, circulating, and leisure) has deeply marked cities after the Second World War. In 1990, Jean-Paul Lacaze [15] listed an inventory of the « methods » of urban planning (strategic planning, urban design, financial management of urban planning, participative urban planning...) which summarises quite well the evolutions and the diversification of urban planning practices since the 1960's. He attributed them to professional capabilities (specialised tasks in disciplines such as economics, architecture, engineering, sociology...) and to some ways of decision-making. Subsequently, the addition of the «communication of urban planning», introduced later by Lacaze, shows the implicit task of a phasing of the « methods »: from this point of view, the urban design derives from ancient knowledge, whereas communication in urban planning expresses a recent way of acting on and in cities. Urban planning has become a lever for urban development, often using a major project, such as the Guggenheim Museum in Bilbao, Spain, as a catalyst.

Today, two theoretical and practical innovations renew the urban planning process. First, the « urban project » [16], which is specific to it and which replaces urban planning that has commonly been dedicated to regulation, or to master planning, or architectural mega-structures. Nowadays, urban planning is conceived as an iterative process of conception and realisation aimed at elaborating concrete plans of action, which become more precise during the process. The second innovation is « governance », which comes with the evolution of democracy and which changes the conditions for the elaboration of the urban planning processes by recomposing the interrelations between power and decision making in relation to spatial development. Today a larger place has been attributed to the associative world.

Therefore, spatial planning not only consists of elaborating maps or regulations. It is not only a technical matter, beyond the reach of a society which delegated the decision making process to experts hidden behind scientific « truths » or a juridical authority. Spatial planning really is a political process aimed at reaching an equilibrium through concerted dialogue between

all the concerned parties – public and private – in order to solve the conflicting demands about the space and to conceive appropriate programmes of urban development. Such processes do not hide themselves behind a «common good». Rather they are processes involving negotiations in order to co-construct the best solution. In this new context, the role of the urban planner includes tasks of mediation, having an ability to negotiate conflicts, mixing scientific and political interests, all of which can be facilitated by a transdisciplinarity approach.

Some Hard Cores: The territories, the project and its representations

The consequences of these recent developments in urban planning seem to subordinate the materialisation of the urban project to a negotiated procedure. So what is the future of urban planning? The importance attributed to the methodological dimension of the practice of spatial planning can stimulate urban research in the social sciences, and it may lead to a profusion of studies about the city and its hinterlands made by several disciplines. If this trend and enlargement of urban issues concerns urban planning, it does not challenge the specific attributes of professional practice in this field: these are interpreting spatial organization and the simulation of projects.

Of course, space is also a centre of interest for geography, architecture and engineering. Moreover the design and construction of artefacts constitutes another aspect that urban planning shares with other disciplines. It is noteworthy that the notion of territory is appropriate for urban issues because it refers to a type of space modified by human occupancy. Within the territorial framework, the urban planner meets the ethnologist as well as the political scientist. The urban planner can learn from the ethnologist how to apply key concepts which transform a space into a place where human culture can be shared. The urban planner can also borrow from the political scientist in order to understand what institutes a space where authority is exerted.

The association of the concepts of territory and project undoubtedly expresses the difference between urban planning and its closely related disciplines: the expert appraisal of territorial dynamics is partially implemented by architecture and civil engineering. Moreover, even if geography analyses precisely the territory, it does not use this analysis to conceive a new configuration and spatial development. Both spatial and temporal dimensions (scales) intervene also to differentiate the urban planning approach from architecture, which is less constrained by long-term hazards and economic and political changes. Urban issues invite all the interested disciplines to co-operate by contributing accurate and unique contributions. At the core, or on the fringe of these disciplines, new branches of knowledge appear, either owing to the changed configuration of the objects of study, or because long-standing models of interpretation are no longer appropriate.

During the last quarter of the 20th Century, urban planning has significantly enriched its expert knowledge owing to the contribution of sociology. Today, the inhabitants are no longer only considered as a simple measurable category, analysed according to familial types and generational series, but as actors having the right to intervene in the definition of their place of residence. Urban planning has also refined the reading of the territories on which it intervenes thanks to progress in geography. It has also acquired a better understanding of the feasibility and efficient conditions of urban projects based on information from advanced economical studies.

The decision making process is also better informed thanks to more attention given to the contributions of political scientists no longer only interested in poll analysis.

Nowadays, fundamental and/or academic research in urban planning is influenced by the tremendous attraction of the rising power of the political sciences and especially their contribution to the analysis of the public politics and «governance». Governance is that kind of complex mix between public authorities and the civil society [20]; urban research cannot remain indifferent to governance, and it should integrate its contributions in its own manner. Indeed, as Callon, Lascoumes and Barthe remarked [21], today's conception of technical artefacts (in which urban planning takes part) cannot only be restricted to the elaboration of confined laboratory research, or research units. It has to implement analytical processes that associate, willingly or not, «outdoor research», that explicitly involve the inhabitants beyond the «participation» legally provided (e.g including «alternative democracy» imposed by the initiatives lead by community associations).

This very short review shows the broadness of the influence and the contributions made by those disciplines interested in understanding how human dimensions can be integrated in urban planning. Meanwhile, this enumeration also shows that urban planning is an action orientated process leading to the production of « hybrids » [2], (i.e. the achievement of spatial development projects, and their material realisation expressed by diverse artefacts implemented by the architect, the engineer and the landscape planner).

According to this perspective, one has to keep in mind that the realisation of projects goes through techniques of anticipated figuration, of graphic and now digital representations, which complement those being developed by the geographers (for example, Geographical Information Systems), and those becoming increasingly important in the domain of architecture and urban design, based largely on the power of virtual reality. The power of these mediums of representation can be measured through the increasing number of animated reconstitutions, especially within archaeological research. This virtual reality has a tremendous potential for the integration of «archimatics» or «urbamatics» in the context of negotiations that will keep enlarging themselves, and which will promote «technical democracy» [21].

Prior to concluding this article, one last issue will be briefly discussed. As in other domains, urban planning research cannot be narrowly limited to the academic community or to large or small research units. Historically, urban planning has appeared and developed itself through the observation of cities, and through experimental projects realised within the context of professional practice. In this respect, the experience of Cerdà is convincing. It led him from *Ensanche* to a generalisation which now has a position in the foundation of the modern planning theory [22]. This example could be completed by many others, which would help to relate diverse contributions, within the urban planning field. For example, to use the fertile distinction made by Jean-Louis Le Moigne, one can compare the «knowledge as an object» issued from the observation of the city, usually produced by the social sciences, with those of the «knowledge as a project», which result from the experimental projects for new human settlements that are often influenced by «knowledge as an object» [18].

The position of a (pure) fundamental science, which watches nature and society from the

ethereal heights of objectivity and distributes good and the bad marks for success and failure to those who take the risk in experimenting in the (impure)applied science, is not bearable any longer. Subject to a deeper study of this issue, it appears that ethical preoccupations, often carried out by uninitiated persons, introduce the essential link between the discoveries made by scientists, the plans of action suggested by inventors, and the social consequences of their applications.

Conclusion : Disciplinary Identity as a Precondition for Transdisciplinarity

This article has considered the state of urban planning. It has discussed the important need for urban planners to reconcile their strong multidisciplinary conviction with another requirement to construct their own disciplinary identity. Indeed, it is rather obvious that a precondition for transdisciplinarity lies in the existence of identifiable disciplines and, simultaneously, in the ability to have a constructive dialogue with other specialised domains of knowledge.

Urban planning is multidisciplinary discipline that integrates professionals, educators and searchers who are specialised in a wide range of topics. Therefore, urban planning should have a set of clearly identified assets, that will enable those who refer to it to develop an accurate transdisciplinary curiosity. Since this curiosity is not a purely formal intellectual veneer, it will be useful, because it can be re-appropriated in a critical manner, for a better understanding of any problematic that is specific to urban issues.

Indeed, nothing refrains urban planners from having diverse profiles, whether they are considered in terms of their academic background, or to the nature of their works, or the type of transdisciplinarity they adopt. Only the breadth of human knowledge and the relative importance attributed to specialisation can limit this transdisciplinary incursion, and to a lesser degree for individuals than for the groups. However, urban planning has to clarify its own identity. This task will permit urban planners to render their transdisciplinary contributions more efficient. In turn, these contributions nourish in a fertile way the theoretical and practical assets of urban planning. Urban planners should pay particular attention to those contributions in which they participate for the creation of places more suitable for everyday life. In the mean time they should also remain open to contributions that other disciplines may offer them in order to achieve this goal.

Beyond national and disciplinary frameworks, one notes that contributions of research work, notably in the urban field, increasingly develop within interdisciplinary trans-national networks. These programmes are related to territorial knowledge, and to actions and projects that can benefit from international comparisons and disciplinary confrontations. They can also benefit from disciplinary co-operation in order to improve current understanding of the dynamics of increasingly interdependent territories and also those complex arrangements of the authorities that implement territorial transformations.

In the future, this co-operation will be all the more efficient when each convergent discipline will be able to delimit its specific contribution, both with respect to the intelligent reappropriation of what is being produced by others, and with respect to the formulation of its own principles and methods. Urban planning is not the least concerned by this stake.

References

- [1] T. S. Kuhn, *The Structure of Scientific Revolution*, The University of Chicago Press, Chicago, 1962.
- [2] B. Latour, *Nous n'avons jamais été modernes*, La Découverte, Paris, 1991 (English translation : *We have never been modern*, Simon and Schuster, England, and Harvard University Press, United States, 1993).
- [3] C. Lévi-Strauss, *Tristes Tropiques*, Plon, Paris, 1955.
- [4] E. Morin, *La Méthode*, 4, *Les Idées*, Seuil, Paris, 1991, p. 174 : « Rationalité et logique ».
- [5] I. Stengers, *L'invention des Sciences Modernes*, La découverte, Paris, 1993 (English translation : *The Invention of Modern Science*, University of Minnesota Press, 2000).
- [6] J.-P. Frey, *Généalogie du mot urbanisme*, *Urbanisme* (304) (1999)63-71.
- [7] K. Lynch, *The Image of the City*, MIT Press, Cambridge, 1960.
- [8] F. Choay, *L'Urbanisme, Utopies et Réalités*, Le Seuil, Paris, , 1965.
- [9] L. Sfez, *La Décision*, PUF, Paris, 1984.
- [10] I. Prigogine, I. Stengers, *La Nouvelle Alliance*, Gallimard, Paris, 1986.
- [11] J. Monod, *Le Hasard et la Nécessité, Essai sur la Philosophie Naturelle de la Biologie Moderne*, Le Seuil, Paris, 1970 (English translation : *Chance and Necessity: An Essay on the Natural Philosophy of Modern Biology*, New York : Vintage, 1971).
- [12] I. Prigogine, *La Fin des Certitudes*, O. Jacob, Paris, 1996.
- [13] V. Berdoulay, P. Claval (Dir.), *Au Début de l'Urbanisme Français*, L'Harmattan, Paris, 2001.
- [14] Le Corbusier, *La Charte d'Athènes*, Minuit ,Paris, 1957.
- [15] J.-P. Lacaze, *Les Méthodes de l'Urbanisme*, PUF, Paris, 1990.
- [16] C. Devillers, *Le Projet Urbain, Pavillon de l'Arsenal*, Paris, 1994.
- [17] E. Friedberg, *Le Pouvoir et la Règle, Dynamique de l'Action Organisée*, Le Seuil, Paris, 1993.
- [18] J.-L. Le Moigne, *La Modélisation des Systèmes Complexes*, Dunod, Paris, 1999.
- [19] J.-P. Boutinet, *Anthropologie du Projet*, PUF, Paris, 1990.
- [20] P. Le Galès, *Du gouvernement des villes à la gouvernance urbaine* », *Revue Française de Science Politique*, 45 (1) (1995) 57-95.
- [21] M. Callon, P. Lascoumes et Y. Barthe, *Agir dans un Monde Incertain, Essai sur la Démocratie Technique*, Le Seuil, Paris, 2001.
- [22] I. Cerdà, *La Théorie Générale de l'Urbanisation*, (presentation and adaptation of the book published in 1867 by A. Lopez de Aberasturi), Le Seuil, Paris, 1979.