

# The "Urbanisation" of Infrastructure: An Interpretative Design Model

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## ***Theme - Background***

As far as urban planning is concerned, the XXth Century is characterised by a problematic position of large-scale infrastructure networks with regard to urban settlements. Recent planning policy shows that the integration of infrastructure is a top priority in large cities. It has proved difficult to create positive interactions at local level, between 'urban' and 'non-urban' elements belonging to the same physical environment. Large-scale infrastructure elements are usually considered as a paradoxical combination of burden and necessity. They are perceived as physical barriers, as generators of low quality suburban areas, although they are essential to the existence and development of the contemporary cities. The disconnection between urbanisation and infrastructure in contemporary cities is the result of a complex process, which will be investigated in this research program.

The research program includes three categories of definition of the problem of infrastructure integration:

1. Towards a multidisciplinary approach;
2. Theory and practice of planning for infrastructure: questioning the complexity of contemporary cities;
3. Methodology of the decision making process for an integrated development of infrastructure and public spaces quality achievement.

***Problem setting***

A clear relationship can be seen between the patterns followed in this century by infrastructure planning and the decline of what I call the professional language of city planning. The notion of language applied to urbanism relates not only to the skill of understanding the urban substance, but also to the development of knowledge for designing it. As we learnt from previous planning experience, to make cities sustainable we must base decisions about them on a more secure understanding of their substance than we have now. What is unclear though, is what we mean by "a better understanding", since there are enough interpretative theories of the contemporary urban space. The problem is that the most part of them remain at a highly theoretical level, inapplicable in the design practice, especially when technology, function and form must be summarised in design guidelines, as in the case object of this study. Unquestionably the issue of infrastructure integration has exposed our ignorance in this critical area. One reason for this ignorance is the dramatic fragmentation of knowledge among the disciplines concerned with the city. I refer to the long lasting separation between the three professional categories directly involved in designing infrastructure: planners, in charge of large-scale zone planning; urban designers and architects, concerned with studying the lower scale functional-spatial synthesis in the city; and civil engineers who take care of technical issues. This historical experience of 'professional apartheid' results in design practice, as a break between understanding and designing, between interpretation and language. The task of this research is not to add an alternative reading of urban phenomena to the existing theories on the city form, but to set the base for regaining specific design knowledge on infrastructure integration.

***Research Methodology***

The concern about the codification of a language (or 'meta-language' as Françoise Choay (1) defines it) of city planning, able to order a taxonomy of the urban space, constituted the core around which the 'science of building the city' evolved in the last century. In the framework of my research, the evolution of this design language will be studied from the standpoint of infrastructure integration. The applied methodology is the use of an analogy with Linguistics, specifically with Semiotics, together with the case study selection. Language is the basic element of urban planning and architectural practice since professionals use design tools and three-

dimensional models to represent their projects and to communicate their ideas. Though often, the symbolic interpretation of graphic signs and spatial volumes is subjective and complex. In the specific case of infrastructure integration projects, the lack of a current joint terminology (graphic/text) to enable an interdisciplinary exchange among professionals to achieve sustainable solutions at different scales of intervention complicate the process of design. As the problem is to enable a better communication among professionals, the analogy with linguistic processes proved to be the most suitable to verify the links between the design practice and the analytical skills of the planner, as theorized by Roland Barthes and some semioticians in the 1970s (2). I refer to the researches carried by Françoise Choay and her group in France, and by Renato De Fusco as director of the architectural magazine *Op. Cit.* in Italy. At that time, the debate was mainly on the possibility of applying Semiotics directly to a reading of the city, in other words to consider the city as a linguistic system. Such approaches, dating from the 1960s, have proved rather sterile, since they were trying to apply to the built environment linguistic analyses without any mediation. My line of research starts from the awareness of the existence of a far older transfer of thinking from language to design processes that continues to be significant, in the form of analogy rather than direct application.

Using the analogy with language as a heuristic device, I started the elaboration of my case studies – which I will describe in the third paragraph - by decomposing the semantic of the planning codes into iconography and texts. The goal is to understand which mechanisms of meaning production are at the base of the design approach on contemporary urban space and which are the determinants to establish fruitful design guidelines.

### ***Research products***

This research leads to two intermediate products, namely:

- \_ A structured catalogue of contemporary urban design practice and theoretical experience in the context of the urbanisation of large-scale infrastructure elements.
- \_ The results of experimental use of linguistics knowledge in urban design discipline to investigate the relationship between planning codes (interpretation) and design rules in the contemporary professional language of city planning.

This research leads to a final product:

- A theoretical model for interpreting and developing the arising urban typologies of infrastructure networks at local and regional scale. This model will be developed through a linguistic-based dictionary/handbook for integrated infrastructure planning (working title: Dictionnaire Raisonné of spatial planning concepts). This tool is directed to the design practice and it will provide a design methodology to encourage efficient communication among different fields of knowledge involved in the development of large-scale infrastructure networks within urban areas. The Dictionnaire will supply design guidelines together with a notation to planning theories on the topic of infrastructure, mobility networks and urban processes. It will be a technical, as well as theoretical (Raisonné), support in the experimentation of new spatial arrangements and new use(s) of infrastructure as an active layer within the urban fabric. The Dictionnaire Raisonné will be developed to deal with the representation of meaning and signs in urban design practice. It will present mutual interrelation among design guidelines, interdisciplinary data and prescriptive codes, together with new typologies (spatial models) of urban spaces/functions related to large-scale infrastructure. Furthermore this model will be useful in further research into the semantics of the built environment. The principles and operational characteristic of the system will be fully developed and specified during the course of the research program.

### ***Relevance for planning knowledge***

Although planning theory has a long tradition in analysing the contemporary urban phenomena in terms of morphological and symbolic evolution of urban typologies, yet very little research has been carried out on the need to develop a professional language in specific contexts, such as the large-scale infrastructure planning. Most of the research spoke about 'language' in terms of analytical design (Secchi, 1988), description/perception of the built environment (Lynch, 1969), or as definition of urban categories and patterns (Alexander 1977). The effects of a comparative analysis between Linguistics and design practice have not yet been researched on the side of city planning, whereas there are evidences of interesting reciprocity in Semiotics research (Eco 1975). My research aims to give a contribution in the field by exploring the possibility to develop a theoretical support (based on the parallelism between design language and Semiotics) to design

innovative solutions and to develop a methodological model for supporting a qualitative analysis of large-scale urban design projects. Using the form of the Dictionnaire Raisonné, an attempt will be made to integrate theoretical tool and practical application.

*Achievements of the past year*

During the work on the dissertation in this first year the original proposal evolved. After the phase of intensive literature study both on the side of Semiotics applied to design theory and on the side of infrastructure planning, the first step was to re-frame the limits of the research area (figure 1), too wide as described in the original research proposal.

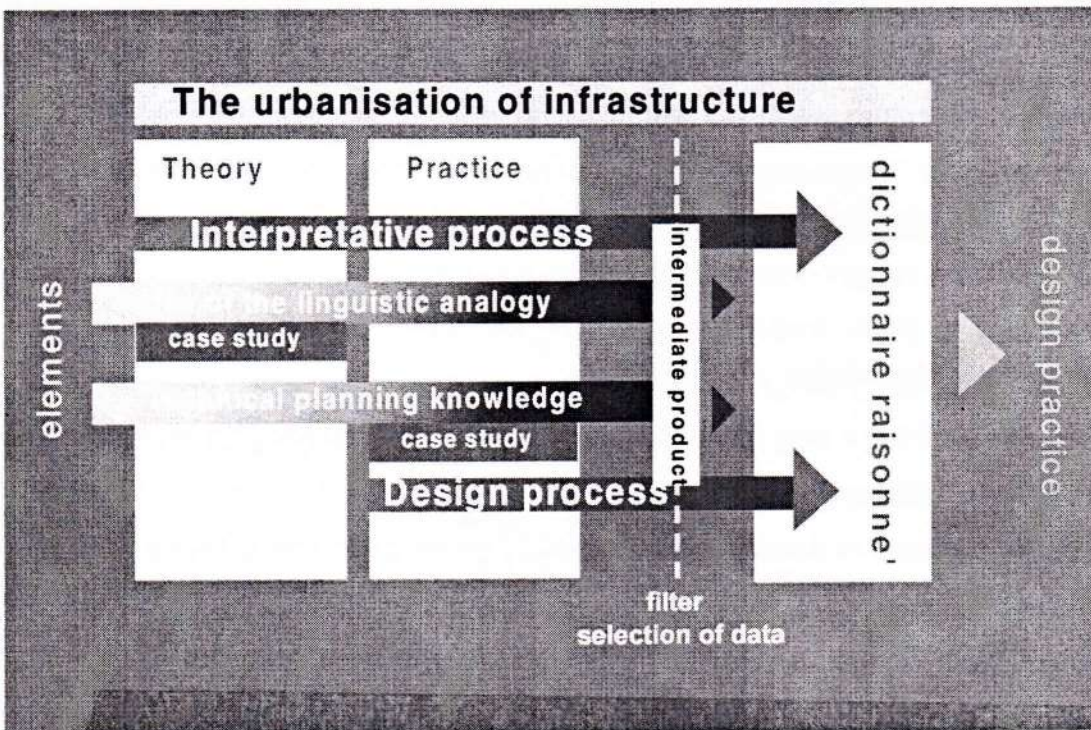


Figure 1. Definition of the research framework: possibilities and limits (1998)

In the first quarter of the past year the research has been focusing on the left part of the schema, which concerns more the exploratory inquiry on methodology (linguistic analogy) and the definition of the case study than the direct elaboration and application of the tool. That was determined by two main questions. On the one side I realised, in an early stage of the literature review, that precedent studies based on the application of the linguistic analogy to urbanism were few and outdated. Furthermore, the main research stream on this topic, based on the studies on the spatial syntax in relation to the linguistic analogy (started in France by Levi-Strauss in the framework of his structural anthropology theory), seems somehow to have vanished at the end of the 1970's. Ergo the problem was to catch up with this temporal gap by trying to explain the reasons why the research on Semiotics was suspended, and by verifying the actual scientific value and consistence of the analogy. On the other side, the innovative character of the end product of this research as a literary type in city planning literature urged to expand the research strategy. Indeed there is no precedent of a Dictionnaire Raisonné of spatial planning concepts directly applicable to design processes, and certainly not for the topic of infrastructure integration.

Because of the above-described complexity of the topic, a double case study was selected:

- \_ a literary case-study on antecedents (a selection of dictionaries, catalogues and manuals of town planning and architecture) in order to determine the methodology to compose the logic structure for the Dictionnaire Raisonné (since no direct example of such a genre was found in city planning literature);
- \_ an exploratory case-study aimed at defining the questions and hypotheses of a following phase of the study (selection of the terms/concepts for the Dictionnaire) and directed at determining the feasibility of the desired research procedures. I chose to focus on a location in The Netherlands where a planning process on large-scale infrastructure is currently taking action. By virtue of its topicality and dynamism, the A2 corridor represented by the cluster of cities along the (inter) national highway Amsterdam-Liege, has been selected.

In the first case study, two antecedents were studied during last year: Viollet Le-Duc's Dictionnaire Raisonné de l'Architecture Française (1858/1990), and Duany Plater-Zyberk Charter for the New Urbanism (1994). The lack of a variety of examples in city planning literature, urged to search for precedents in the closest discipline (based on design language) with a long tradition

of specialised dictionaries: architecture. Since Vitruvius' Ten Books on Architecture, architects and academics attempted to codify the design language by means of structured indexes. But only during the last century with Quatremere de Quincy (1832), and Viollet-le-Duc (1858/1990) the Dictionnaire developed as the first real thesaurus of architecture by becoming 'raisonné'. The invention was to reorganise the design language into a practical tool for professionals and scholars, and, parallel to express through its logic structure a theory on design. I decided to select Le-Duc's Dictionnaire as the most accomplished and inspiring example of this type, also by virtue of the result of semiotics studies previously applied to this work. Le-Duc chose to arrange his argument according to the 'disjoined pattern' of a dictionary surely not because he sought for the easiest way or lacked a systematic mind; on the contrary, he opened the way to a new approach of studying and doing architecture, that of structural analysis. The concepts of hierarchy and subordination enable us to appreciate Le-Duc's choice for the dictionary as a logic way to handle the enormous amount of data and references he acknowledged, and to frame them into the perspective of design applicability. Besides it shows to be an effective method to control the relative position of each term of the discours architectural within a larger theoretical framework and the way in which these terms combine to establish both the building (representation) and a body of knowledge (theory). The tool to be developed as the end product of this research has the same purpose.

The other precedent selected as a methodological referent is derived directly from city planning literature. As mentioned before, despite a long tradition in writing manuals and critical indexes of architecture, the discipline of city planning has still to produce such a work. Although some could argue that Alexander's A Pattern language (1977) is a valuable-attempt to summarise theoretical knowledge and practical application of design norms, for the extension and the enormous amount of data it includes, this work is more an encyclopaedia of city planning and architecture than a Dictionnaire Raisonné. Hence it can not be directly practicable by planners and architects as an handbook. Recently the Congress for New Urbanism (CNU), presented a very interesting glossary of spatial concepts and design guidelines as a manifesto for their planning theory: The Charter for the New Urbanism (1996). Under the title 'General Terminology' a list of more than 500 terms is used to 'explain' New Urbanists' planning theory. The reason to choose CNU as the second case

study on precedents, was not only its actuality and applicability, but also the direct involvement in the development of a professional language. To some extent, this is a unique example of current application of a planning theory, which disentangles the semantic aspects of the design process. The purpose is close to Le-Duc's work: to codify a design language (framed in a specific operational scale) by mean of linguistic codes directly applicable in the design practice. In spite of the distance in time, the degrees of comparison between these two extremely different dictionaries of design language demonstrated to be so exhaustive as to confirm the appropriateness of the linguistic analogy in researching the evolutionary process of city planning design language by:

- \_ explaining the use and function of a Dictionnaire as a coherent theoretical tool as well as a direct design support for architects;
- \_ suggesting the methodology to structure the end product of this research.

I also defined the second case study, which involves the analysis of the A2 corridor, already mentioned in this report. Whereas the purpose of the previous case-study was to create the theoretical background for the entire research, this part is dedicated to framing the substance of the Dictionnaire, that is to say to defining the criteria for the terms selection of the dictionary entries. It interests the collection of data concerning the current situation for infrastructure integration planning in The Netherlands and the analysis of the leading key words used by different actors in the decision-making process. In a further stage of the work the data will be translated into design codes (entries of the Dictionnaire Raisonné) which will constitute the model for the end product. This part of the research, the results of which will be published next year, will be sponsored by the A2 cities (Amsterdam, Utrecht, s'Hertogenbosch, Eindhoven, Maastricht and Liège). This study is subordinate to the general research purpose, which is to elaborate a theory on infrastructure integration by means of a dictionary. The field-research will supply the necessary data for the end product as an example to be generalised for other similar situations. The interest of the cities along the (inter) national highway A2 in researching the meaning of infrastructure within the built environment and, concurrently, in developing a common strategy to achieve the 'urbanisation of infrastructure' will stimulate this research to

elaborate the dictionary as a practical and applicable tool. Currently the basic structure of this analysis was just defined, and I'm working on the data collection.

I return to the schema presented in figure 1 - the part related to the application of the model to the design process. Until now I was discussing the theoretical structure of the model rather than the definition of its application into design practice, while there are developments on that side too. I started to analyse the applicability of the model, which would represent the 'designing' side of the Dictionnaire, intended as a summary of design guidelines to support professionals in planning and designing infrastructure integration. This is expressed by the development of the framework for the documentation analysis and it will represent the basic structure for the end product. Framing the model lead to a deeper understanding of the difficulties occurring both in the contemporary Dutch infrastructure planning practice and in the consequent development of a specific city planning knowledge for the topic. These problems can be briefly summarised, for the two categories (theory and practice), as follows:

Theoretical elaboration on infrastructure planning practice in The Netherlands involves evaluation problems:

- \_ which are the cause of partial insights of the current changing in meaning and function of infrastructure within the built environment;procedural problems -
- \_ which are the principal cause of conflicts between national and local policies for the long-term planning of urban infrastructure;interpretative problems -
- \_ which are the cause of unsatisfactory definitions or even more, of confusing metaphors on the city-infrastructure relation;temporal problems -
- \_ which are the cause of delays in the approval of plans and long lasting procedures to mediate the expectation of all the parties involved; Linguistic problems -
- \_ which lead to a gradual impoverishment of the design practice and which restricted the topic to the pure civil engineering aspects.Linguistic problems -
- \_ which are the cause of misunderstanding due to an improper use of technical terms/concepts such as 'corridor', urban integration', transferia, etc.

**Conclusions**

This paper will report the preliminary results of the initial phases of this research process. It will be divided in four parts:

- \_ A first part will explain the reasons why the theme of infrastructure is an occasion for a critical review of city planning;
- \_ a second part will focus on the links between language and design in relation to urbanism and, consequently, on the choice of the linguistic analogy as a research methodology;
- \_ the third chapter will provide the conclusions of the first case study together with a report on the second one;
- \_ In the final part of my essay I will introduce some additional factors in the choice of the Dictionnaire Raisonné of city planning as the end product of this research.

**Notes**

1. Françoise Choay, *L'Orizzonte del Posturbano*, a cura di Ernesto d'Alfonso, Officina Edizioni, Roma, 1992; *Remarques a propos de sémiologie urbaine* in *Op. Cit.*, 1968; on the concept of urban design as a meta-language see Choay's theory in "The modern city: planning in the 19th century", G. Braziller, NY 1969)
2. see *L'Architecture d'Aujourd'hui* n.132, 1967, monographic number on Urbanisme and the complete series of *Op.Cit.*, 1968-1970. In particular, Roland Barthes, *Semiology and Urbanism*, *Op.Cit.* n.10, 1967.

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