Architectural models: legacy and critical perspectives

Filippo Fiandanese

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1   The notion of model has played a primary role in the practice and theory of Architecture and Urban Sciences[1] since the very beginning of the development of an autonomous theoretical discourse in both disciplines.This concept has evolved over time, and has come to exist through periodic discussions which have resulted in a longstanding debate with recurring waves and peaks of intensity. This can be seen in publications such as the seminal Laugier's *Essai*[2] or during what Christian Girard[3] has called "*vague scientifisante*", as well as Philippe Boudon's[4] and Françoise Choay's[5] investigation of the scientific basis which underpins the architectural discourse building on the concept of model, following Foucault's[6] work on epistemology.

2   In recent years, this concept shows to have reached a new level of interest in architectural and urban theory. Unlike in the past, the notion of model is no longer questioned as an epistemological concept nowadays, rather used to interpret the design of architecture and city.

3   This attention shows the importance of a notion that combines a longstanding legacy with a flexible definition, resulting from an accumulation of debates and discussions. New forms of urbanisation are currently emerging around the world, and thus require a renewed debate on the epistemological foundations of the term in order for critical urban theory and practice to be updated accordingly[7]. Given these circumstances, the questions of what models are and how the concept has evolved should be considered. The current age is characterised by intense exchanges through transnational actors[8], and models could serve as an instrument to question how space is conceived, especially in those cases which appear to be shaped by assemblages of transnational models[9]. In fact, transnational models and their successful iconic-related images play a crucial role in the rise of new urban imageries. The notion of model therefore appears to be a device of knowledge that provides interesting and currently under-explored possibilities. In the first part of this article, the intricate meanings of the term, wisely described by Anne Coste[10] as polysemic, will be discussed. Then, the 1970s

epistemological debate around the notion of model, indeed the most intense peak of the discussion on it, will be summed up in order to compare and relate this theoretical heritage with the recent resurgence of models in certain contemporary works.

The notion of model in architectural tradition: a longstanding heritage.

4   Unlike other theoretical concepts with a clearly established and shared definition, such as type, model does not have a univocal definition. Anne Coste[11] has appropriately discussed the "polysemy" of the notion of model in architecture to describe the multiplicity of its connotations, which may sometimes give rise to confusing ambiguities and ambivalences. Furthermore, model is not only an umbrella term which covers an extensive range of meanings, but a concept which appears strongly interwoven, and sometimes overlapped, with other concepts crucial to architectural theory such as "type"[12], "icon"[13] or "imitation"[14].

5   Etymologically, the term "model" comes from the late Latin term *modellus*, an alteration of the classical Latin word *modulus*, diminutive from *modus*[15], which means "measure", or "unity of measure". During the Renaissance age, the expression *modello* appeared in Italian, used in sculpture and architecture to indicate a measure to refer to. The term was then spread to French: *modèle*, English: *model*, and German: *Modell.* Since its origin, the term has been characterised by its ambivalence: designating both its original sense, the material object, as well as its figurative sense, the abstract norm[16].

6   Nevertheless, the concept of model came prior to the appearance of the word itself, dating back to the discussion on artistic production in Greek philosophy. It was marked by the idea of mimesis, namely the imitation, or reproduction of nature in an artistic composition.

7   Moreover, model is strongly related to the act of modelling, which is a concept of thinking, a way to conceive and to deal with reality and action. According to François Jullien, the act of modelling is the main distinctive strategy of Western thinking, "one of the most characteristic moves of the modern Western thought[17]". Modelling is typically a planning activity which consists of imagining an idea, an ideal form – the model – which is assumed as a goal to be achieved[18]. We can note here the relevance of the construction of a representation – the idealised form – which is at the base of representational models in the sciences[19], as well as in architecture.

8   In fact, the concept of model is not only a specific disciplinary concept, and thus has other uses which come from common language or other fields and which create continuous contaminations to the meaning of the word. Hence, in several disciplines, the notion of model is largely adopted with different nuanced meanings, having primary relevance in epistemology and logics, fostered by the mathematisation of sciences[20].

9   Indeed, the term has seen a progressive evolution and shift in meaning since its original connotation in the Beaux Arts, as it gradually spread to a large variety of disciplines. Moreover, as pointed out by Suzanne Bachelard[21], the term has now assumed different related senses which are not always well defined, frequently resulting in "interferences". Serge Diebolt goes even further, highlighting the semantic complexity, the systematic overlapping of different symbolic representations in the

term model, which he defines as "a system of symbols [... indifferently and simultaneously graphical, discursive, mathematical, iconic[22]" .

10   Michel Armatte[23] has identified five classes of meanings for the term model: model as a *reference*, a prototype to reproduce; model as a *mock-up* of a real dispositive; model as an *ideal type*, detached from a standard; model as an *icon*; and finally, model as a logic-mathematics *formalism.* Apart from the last meaning, referring to mathematics, the four other classes listed above may also be used to classify models in architectural and urban science disciplines, all gathered by the idea of being: "the ephemeral trial that comes before concrete reality (whether in thoughts, theories, intentions)"[24].

11   Anne Coste[25], however, distinguishes three different functions of the term model in architecture: it is adopted to conceive, to represent and to understand. Hence, the model in architecture and urbanism is a device which can provide different instrumental purposes[26], shifting from an imitative to a speculative function.

12   A large variety of things may commonly be assumed as models. This includes physical objects, fictional objects, set-theoretic structures, descriptions or some combination of the few, sharing the purpose "to occupy an indeterminate, tentative, even disposable domain between our hopes and reality"[27]. Models are therefore a representation, an image – *eidos* we would say – with a different degree of abstraction, produced to operatively interpret or modify reality, a device to produce an effect according to our desires, using a strong, indissoluble link with the idea of imagery[28]. In this regard, the model is the element that links the project (the image, or *eidos*) and the reality; just as it is the device linking an original new object to an imitated one[29] , with the necessary consequence of an impossible coincidence of the different planes, resulting in a constant deviation[30].

The epistemological debate on models

13   Above we have seen that the notion of model in architecture and urbanism may be instrumental to "understand"; this function, however, may also be conceived as a way to "know", in relation to the possibilities of establishing knowledge in architecture and urbanism.

14   It is no coincidence that, since its publication, one of the most influential books on architectural theory, *Essai sur l'architecture* by Abbé Marc-Antoine Laugier [31], has experienced a long debate surrounding its dissertation on model[32]. One of the pillars of the nascent modern discussion on architecture explicitly builds on a particular model: the primitive hut:

>   The little hut that I have just described, is the model upon which all the magnificences of architecture have been imagined, it is in coming near in the execution of the simplicity of this first model, that we avoid all essential faults, that we seize the true perfections[33].

15   The centrality of a model as one of the starting points in the modern debate on the discipline of architecture is not only evoked by the above-mentioned words, but also by the widely renowned allegorical representation of the hut-model on the book's front cover – which is maybe the most renowned illustration of architecture's origin[34].

16   The discussion developed by Laugier builds on a rediscovered theory of imitation of nature, and clearly reminds us of classical philosophy, the arts, and consequently

architecture as well, according to the Jesuit originate from a mimesis of nature. This imitative process produced the primigenial model, namely the primitive hut, embodies the encounter between nature and reason[35]. This vision of the origin and evolution of the archetype, which establishes a modern conception based on reason and necessity consistent with the Enlightenment era, is surely opposed to the medieval idea of model, which was instead based on symbology.

17 In fact, discussing the role of the Holy Sepulchre[36] in the iconography of medieval architecture in Jerusalem, Richard Krautheimer[37] has pointed out that, at the time, "the model is never imitated in toto. A selective transfer also of the architectural elements takes place". Since "the mediaeval beholder expected to find in a copy only some parts of the prototype but not by any means all of them".

18 Deep changes in the conception of the notion of model are therefore suggestive of new paradigms in architectural thinking. More recently, the concept of model has played a significant and prominent role in some attempts to provide an epistemological foundation for architecture. This was especially the case in France in the 1970s, in the frame of a general call to search for a scientific basis in disciplinary discourses following the debates[38], originating from the publication of Michel Foucault's *Les Mots et les Choses*[39] in 1966 and *L'Archéologie du savoir*[40] in 1969. This *"vague scientifisante"*[41] is clearly expressed in the research of two French theorists whose works will be briefly examined: Philippe Boudon and Françoise Choay.

19 In her seminal book, *La règle et le modèle*[42], Françoise Choay aimed to discuss the origins of an autonomous theoretical discourse about built environments (*espace édifié*)[43]. In her work, she retraces the two principal formulations through which disciplinary discourse on architecture and the city has been organized: the "rule" and th e "model", respectively vehiculated for the first time by two founder texts (*textes instaurateurs*) dating back to the Renaissance period in the Western world[44]: *De re aedificatoria* by Leon Battista Alberti and *Utopia* by Thomas More.

20 The "rule approach" refers to generative principles which provide design solutions that are able to adapt to different local and social conditions. The "model approach", however, provides universally viable solutions which can be reproduced everywhere, remaining indifferent to context[45].

21 Choay's aim goes beyond the intention to develop a reflection confined to disciplinary boundaries, even stating that her purpose is more ambitious: "to provide material to a reflection on the Western cultural identity[46]".

22 In her analysis of *Utopia,* Choay points out the centrality of space in More's text, "although paradoxical, Utopia, that is nowhere, nonetheless is first of all a space[47]". In Utopia, two different overlapping images of utopian spaces are presented. These underpin the entire account of the island, crossing through all scales, from the city to the household. Choay distinguishes the first image, which she calls "portrait[48]", from the second one, the "model". The portrait is, on the one hand, a description of an individuality, a space with unique spatial connotations and geographical positions. On the other, the model entails the construction of an abstract image, an image deprived of any connotation of localisation. The model is the reduction of space to a prototype devoid of any temporal or geographical dimensions, but reproducible to a "universalizable device".

23   The space model is strongly interlinked with the society model, serving as its support, "in integral and necessary part[49]". The space model/model of space in Utopia is a way to move "through a mirror"[50], a critique of More's contemporary English society, a "modelling critique" (*critique modélisante*). According to Choay, the great merit and innovation of More is the discovery that a society can turn into something different from what tradition has shaped, a society which has a fundamental support in the spatial organisation and in the model of space: "the concept of the model space is connected with a conception of history and work underpinned by a value system[51]".

24   Vittorio Gregotti[52] has also discussed the relationship between utopia and model, although differently to Choay as he opposed the two terms. In fact, the Italian architect distinguishes the utopic project (*progetto utopico*) from the model, the former being intentionally unrealizable: "it has remained on paper not by accident, but by design decision[53]". It is a projection of an a-temporal, a-localised, a-historical condition, and is inseparable from a political social dimension. On the opposite side, the model operates in a defined phenomenal contest as a design device, "pure design instrument[54]", able to establish relationships with materiality. The power of the model, according to Gregotti, consists of providing an aesthetic meaning to an operation of re-foundation, towards a transformation to new authenticity. This is an idea of model which has recently been recalled by Bose, Cisar, and Brennan[55] in their editorial, *We Live in Models,* where they state, "the potential of models is not representational, but rather to collapse notions that the existing is in any sense the natural order of things".

25   While Choay's research took strictly the written production into consideration, Philippe Boudon[56] also looks to the architectural physical production in his longstanding struggle to define a scientific system of Architecture since the 1970s – following the publication of Sur l'espace architectural[57] and in particular Architecture et Architecturologie[58]. His efforts are based on Structuralist thought, with references firstly to the works of de Saussure and Foucault, with the aim of establishing an architectural epistemology which he named architecturology. Architecturoly is, in Boudon's intentions, a meta-theory which aims to establish the knowledge of architecture as a scientific object. It is a meta-theory because Boudon's purpose is to provide a conceptual basis for architects' theories[59]. The scientific object of architecturology in the epistemological field of architecture is the architectural project. This is the product of the architect's work, namely the architectural conception, which is underpinned by modelling operations. The architectural conception is thus conceived as a system[60] which can be scientifically analysed, made intelligible by an activity of modelling. We can see that the concept of model plays a crucial role in Boudon's work. The architectural conception is a process which implies different operations that can be schematised with a mathematical analogy: by the interaction between an "operand", the model, and an "operator", the scale[61]. In Boudon's work, the model, as an epistemological concept, is read according to three different *episteme*[62] analysed by Foucault, "toward the model, three epistemological attitudes seem possible. They correspond to the systems of positivity that, according to Foucault, characterise the pre-Classical, Classical and Modern Ages[63]". The three different attitudes give rise to three different reading grids of model: in the first age, models are connected to the notion of resemblance and similitude (analogy); in the classical age, "representation" establishes rules for proportion in architecture; in the final, and current age, the model becomes part of a system and is no longer "realist",

maintaining only a theoretical reality[64]. The model, therefore, appears as the central problematic of architecturology, Boudon making the point of defining its meta-theory as "the theory of the model as a theory[65]".

26 Every operation of copy in architecture, according to Boudon, is a combination of the actions of *repetition* and *reduction* of the copied object. The two actions represent two extremes: *repetition*, which is the closest to the copied object and has a metaphorical character, conveys an aspect of the object which is entirely represented; and *reduction*, which is the most distant from the copied object and has a metonymic character, conveys only a part of the object which undergoes a "crop operation".

27 During those same years, Jacques Lucan[66] also participated in the debate from the review *AMC*. Similarly to Boudon, Lucan also questioned to the possibility of investigating the project, building on contemporary philosophical positions (such as Derrida, Levinas and Deleuze) with some common basis – the similarity language-project and concepts such as model, form, imitation and repetition – but with a conflicting conclusion. The French critic, in particular, distinguishes between two different activities, separating the "imitation of model" from the "repetition of a process[67]". The repetition of a process to generate a form makes possible the production of innovations, resulting in necessary differences that orient the design process. These processes are mainly influenced not by a recognition of so called "exemplary models" (those derived from a heritage), nor by "theoretic models" (types), but rather by a balance of power. Hence, according to Lucan, design activity is not produced by models. On the contrary, the project, conceived as a tool of knowledge, "allows to qualify the typical differently from the figure of a fixe and independent form; the project allows to qualify the typical as form of a balance of forces, and not as archetype (invariant)[68]". As a consequence, "the project has to be thought not so much in typological terms (models, types), but in topological terms (forces, balance of forces, force differences, relations of production[69]". Philippe Panerai, Jean Castex and Jean-Charles Depaule[70], on the basis of similar premises, have used urban form, a result of the circulation of models, to investigate the evolution of cities, stating that models are the schemes at the base of the architect's thinking and that they are suggestive of the general conditions of a certain historical period. Their position is indicative of an idea of model, slightly moving toward the concept of type – recalling the ambiguity already retraceable in the writings of Quatremère de Quincy. This stance has shifted the concept of model toward a limited vision and toward a morphological approach to the city that goes on to have much success in the international debate on architectural theory during the 1970s and the 1980s[71].

28 During the same period, while in the French context – and to a lesser extent in Italy – the debate around models developed from an epistemological question – also deviating toward the concern for the morphology – , in the Anglo-Saxon context, the discussion on design methodology proposed a modelisation of architectural conception. John C. Jones[72], for instance, investigated the process of models, namely the procedures for designing. Around the same time, Christopher Alexander[73] aimed to find a rationality to explain how forms are shaped, and therefore tried to schematise the procedures that give rise to them in order to find the logical structures behind them. Also building on the linguistic analogy, Alexander proposed two hundred and fifty-three patterns, whereby "each pattern represents our current best guess as to what arrangement of the physical environment will work to solve the problem presented[74]". Together, the

two hundred and fifty-three patterns form a language, with the structure of a network. According to Alexander, they describe a problem and then offer a reproducible solution. Therefore, the reproducibility seems to lead back to patterns of the concept of models. Nevertheless, their extremised archetypical connotation limits them as a peculiar group of models: archetypes.

29 In short, the debate that arose in France in the 1970s, albeit built on common philosophical foundations rooted in Structuralism and Linguistics, reached different conclusions on the role and nature of models. Reproducibility is indeed a common point, as well as, in Choay and Boudon, the idea that there exists a sort of Model, "something above" which encompasses all the models, a sort of *a priori*. While for Choay, it is the model as a paradigm for utopia, Boudon believes it is the model which coincides with the system of architecturology. Nevertheless, the theoretical construction of both, even if rigorous, seems to be too rigid, giving rise to subsequent criticism[75]. This is also perceivable in Lucan, who completely reverses the question, laying the project, as an instrument of knowledge, at the base of models.

30 In the Anglo-Saxon context, models were discussed in parallel by scholars such as Jones and Alexander in terms of methodology of design, instead of epistemology. In these cases, the issue lead them to a more practical question: "how to design?", instead of, "how is it possible to scientifically talk about design?"

The recent resurgence of the model-debate

31 As discussed above, the concept of model has seen a certain success in France from the 1970s-1980s. This arose from an effort to build a disciplinary epistemology of architecture and urbanism, which was followed by criticism that was also due to a crisis of the Structuralist thought underpinning those attempts[76].

32 Nevertheless, in recent years, the concept of model is resurging in the disciplinary debate. This resurgence, witnessed by a flourishing of monographic journal issues[77], conferences and seminars[78], single articles, as well as books and exhibitions[79], still maintains its centre in France, keeping the 1970s-1980s debate as a background, but rarely as a basis to build on a new notion of model. That is to say, there is no explicit effort to re-theorise the concept, its definition remaining generally quite open, undefined and uncertain. This aspect is quite surprising in the context of a call for renewed debate on the epistemological foundations for an updated critical urban theory and practice in the age of globalisation[80]. The questions around the nature of the concept of model deserve a deeper investigation in order to understand how cities nowadays are produced by reproducing, assembling and manipulating models.

33 In the 2010s, we could identify two macro categories re-flourishing in the use of the notion of model. The first category is connected to studies on contemporary urbanisation processes and the urban phenomena related to globalisation; the second, instead, is linked to an "history of model(s)" or "model(s) in history", including both the history of the notion itself, as well as the history of a specific model. Indeed, there may also be found some contaminations between the two categories.

34 In the first case, models are investigated as an object of international circulation, mobile references navigating in the contemporary globalised and barrier-less world. In this regard, research on transfer and reception of models frequently adopts the work

by McCann and Ward[81] as an interpretative basis, despite the fact that, in their book, the term model is seldom employed. The book rather constitutes a benchmark for its "effort to conceptualise global-urban connections[82]", investigating the mobility of urban policies. As a matter of fact, several recent works using the term model to investigate contemporary urbanisation often contain a fundamental ambiguity, equivocation: frequently arguing from the notion of model in architecture, they then operate an unsolved shift in meaning toward an often-vague concept of "urban model". Söderström, for instance, questions "what is an urban model?[83]", building on de Quincy and Choay's definitions of model, then moving the discussion towards a notion of urban model strictly related to the issue of policy transfer. He does this, however, without providing a clear definition, rather stating the fluidity of the notion. This vagueness is also confirmed in Söderström's identification of three different categories of urban models[84] (1) "cities in their entirety", in respect to their successful policies, on a global plan such as the so-called Barcelona model, or in relation to a specific aspect of urban governance (transportation, cultural promotion as examples); (2) "specific aspects of an urban policy" not directly related to a precise city or space; (3) a "mix of policies and formal solutions" which are defined as "*types urbains*", urban types, such as waterfronts or pedestrian streets.

35   Furthermore, the use of the term model as a "container of meanings" goes also unsolved in another contribution to the discussion on the international circulation of urban models edited by Peyroux and Sanjuan[85]. They state in the dossier in question that the notion of model "refers to an ensemble of objects, policies, urban doctrines, good practices or labels that share a common element: they are employed as references for the imitation and reproduction in a context different from that of initial production[86]". Therefore, we can again see the use of the term model to describe a large spectrum of different elements: from physical objects to policies and good practices. A variety is subsequently reaffirmed when the authors interestingly recognise a double operability of models in urban production, acting both on the ideal plan and on the physical dimension. The condition which reassembles a similar diversity of situations is, therefore, the condition of reproducibility: models are a heterogeneous category of elements which can be reproduced and imitated elsewhere. On this point, the position of Peiroux and Sanjuan is slightly divergent from that of Söderström, who seems to point out the process of free de-construction and re-assemblage suggested by urban models, instead of a reproduction process.

36   In short, a first category of research building on the issues of urban policy circulation, adopts the notion of urban models to investigate processes of the international transfer of a large variety of references. Urban models become all those elements that shape contemporary urban space: from architectural objects to good practices adopted by municipalities, often cities themselves, regarding their materiality, their image or their policies. Fluidity seems to be a keyword here: that is, the circulation of references and generic urban models appearing as the magmatic heterogeneous fluid circulating worldwide. Hence, a new theorisation of the notion of model appears arduous, and maybe not a primary concern, preferring to practically question: "urban models, to do what?[87]", for instance.

37   In these analyses, the gaze often seems to implicitly tack from the model to the act of modelling, in other words to shift from a concept – model – to a process or procedure – modelling. Recent works on urban models, in fact, clearly privilege an emphasis on

processes instead of structure: in this case, namely actions or urban policies are investigated rather than things, the object-model. Furthermore, an inappropriate and confusing swing from model to the simplifying act of modelling was already advocated as a risk by Choay[88] in the conclusion of her book, when she stated that contemporary urban discipline and project were often degenerating in an abuse of modelling operations, losing sight of the model nature, depriving it of its value and power.

38   In this first group of works centred on the term model, the reference to previous notions of model in architectural and urban theory is almost neglected and generically reduced to "spatial projections and images of the future city[89]", and the shift from the already established definitions and their use is often roughly discussed. Thus, another category of recent research has discussed the notion of model in an historic perspective, with an explicit gaze on precedent debates. This second group collects a larger heterogeneity of aims. Unlike the first one, whose purpose was essentially to investigate the circulation and transfer of references on a planetary scale, here the rediscovery of the concept of model does not have a unique objective.

39   Anne Coste[90], for instance, debating on "*Quel sens en architecture pour le polysémique terme de modèle ?*" has investigated "what history of architecture teach us" and "what architectural theorists tell us". Focusing now on only the title and the two subtitles of Coste's work, it is easily possible to outline how the question of model is addressed. Firstly, a variety of different meanings, the polysemy of the term, which need to be traced back in search of sense, out of a necessity to provide categorisation and, consequently, an order around a word often employed in an ambiguous and confused way. Ambiguity, which, according to the author, is paradoxically a carrier of meaning.[91] Secondly, the two subtitles underline the historicity of the notion of model: to reflect on it, to investigate the "idea of model", is somehow a way to develop a history of the history and theory of architecture. Nevertheless, Coste's purpose is by no means solely to build a history of the notion of model, instead she aims to investigate and propose the use of the concept of model as an operative tool to investigate and to learn from architecture "*entre rétrospective et prospective[92]*".

40   Thierry Paquot's[93] article builds on a historical perspective, and could be placed at the intersection of the two categories of work on model that we traced. Through an excursus where he retraces "*les trois temps de la mondialisation du monde[94]*", he criticised the evolution of models' imitation, which in the last "time" has produced an overwhelming standardisation and uniformisation of urban space at the global scale.

41   Another interesting and peculiar case to report is represented by the exhibition, and its catalogue, *Paris Haussmann. Modèle de ville*, was held at the Pavillon de l'Arsenal, Paris, January 31st-June 4th, 2017, and was curated by Benoit Jallon, Umberto Napolitano, architect founders of the French agency LAN, and Franck Boutté. The aim of the exhibition was not simply a celebration of the Baron Haussmann diligence, nor a glorification of its product – the renovated, modernised city of Paris. Instead, the exhibition was built on contemporary urban design, as clearly stated in the catalogue, on the production of urban space nowadays: notwithstanding the great amount of debates, competitions and projects, alongside new methodologies and concepts, with unsuccessful results, failing to "make the city" and "make any sense[95]". This raised the question, "where is it possible to find a model able to "make the city" to provide it with meaning?" To which the curators responded: the centre of Paris, referred to as a " *modèle de ville*", provided by "a [...] relevance"[96]. Through a very interesting recourse to

drawing as a tool of investigation, the curators showed how a summation of very different factors[97], that are apparently in contradiction, shall ensure that the city renovated in the XIX century remains today a model that is able to deliver a reference for its surprising capacity to establish a meaning to the city, a "*sens de la ville*". The drawings displayed in the exhibition as well as the catalogue outlined how "the" model, the Haussmannian Paris, is actually a thought, a design and a collection of several elements – facades and their ornamental parts, urban furniture – which are themselves models or sub-models. Hence, the "*modèle de ville*" is composed by the assemblage of various models that, through a general coherence, produce an aesthetic and functional unity, shaping the city and its model.

42   In short, the second category of works uses the notion of model that recurs in the lens of history, operating as a "history of model", as in the case of Coste[98], or to observe "model(s) in history", as in the contrasting approaches and aims of Paquot[99] and Jallon, Napolitano and Boutté[100]. Even so, these bodies of research do not call into question the concept itself, as they do not re-theorise the concept of model. Nevertheless, the term model seems to be used in a more conscious, less fluid or ambiguous way, otherwise ambiguity itself becomes the object of investigation, such as in Coste's work. The *fil rouge* gathering these works adopts a historical lens of observation surrounding the question of sense – the sense of the term model itself[101], the sense of cities' uniformisation[102], "the sense of the city[103]" – and a gaze "*entre rétrospective et prospective*[104]". Namely, the concept of model is exploited to interpret[105], to criticise the contemporary production[106] and to propose new paradigms in the design of the city[107]. Indeed, in this last case, the vision of model is different from the conception expressed by Gregotti[108] and Choay[109] in the 1960s-1970s, as it is not a projection of a future which breaks with the present, even if it is an aspiration for a re-foundation. Instead, it builds on a modelised past and thus is possible to perceive some traits common to the model in Laugier. More than 250 years ago, the Abbé also discussed his proposal to re-think architecture from a model of the past. In this case, the archetype for antonomasia also marks a difference, however, the primitive hut does not have a precise localisation – someway in mythical Arcadia? – nor a temporal dimension, rather, it is out of the time, it is the origin. In fact, the model of Laugier refers to a myth, while the Haussmannian Paris is obviously something very clear in terms of time and location.

43   To sum up, this last category of works shows how the debate on model in architecture is still vivid and varied. Furthermore, it makes clear how the concept of model can be adopted as an operative tool: it may provide new frontiers in historical interpretations, in the critique of design production and, beyond the theoretical field, may be a starting point for new ideas, new paradigms and new *models* in design practice.

44   In conclusion, this review shows how the notion of model may still be crucial in discussing architectural and urban theory and production. Moreover, recent issues, such as the relevance of globalisation and its transnational networks, are resulting in a new focus on models. In fact, their study may provide an efficient instrument to reveal geographies of circulation of references, as well as to deconstruct and unveil successful imageries that are globally reproduced.

45   Certainly, the contemporary urban space is produced by adopting, manipulating and assembling models characterised by a transnational circulation[110]. Nevertheless, what models are and how they can be used to study the urban dimension is rarely investigated, despite the necessity of a renewed debate on the epistemological

foundations in order for there to be an updated critical urban theory[111]. Undoubtedly, by investigating their *representation* and *conception functions*, the *understanding function* of models may offer a powerful device to investigate the architectural and urban production, thanks to the intrinsic nature of models being in between the conception, the design and the physical results.

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Wolfgang Herrmann, *Laugier and Eighteenth Century French Theory,* London, A. Zwemmer Ltd, 1962.

Benoit Jallon, Umberto Napolitano and Frank Boutté, *Paris Haussmann : Modèle De Ville/A Model's Relevance.* Paris/Zürich, Éditions du Pavillon de l'Arsenal/Park Books, 2017.

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Marc-Antoine Laugier, *Essai sur l'architecture.* Duchesne. Paris, 1753.

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Antoine C. Quatremère de Quincy, "Type", in *Dictionnaire historique d'architecture, contenant dans son plan les notions historiques, descriptives, archéologiques, biographiques, théoriques, didactiques et pratiques de cet art*, vol 2, Paris, Librairie d'Adrien Le Clere et Cie, 1832, pp. 629-630.

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Ola Söderström and Thierry Paquot, "Modèles urbains", *Urbanism*, n°383, 2012, pp.41-42.

NOTES

1. The centrality of the concept of model in architecture and urbanism since the emergence of an autonomous theoretical discourse will be discussed below, in regard to Choay's work.

2. Marc-Antoine Laugier, *Essai sur l'architecture*. Duchesne. Paris, 1753.

3. Christian Girard, *Architecture et concepts nomades. Traité d'indiscipline*, Bruxelles, éditions Mardaga, 1986.

4. Philippe Boudon, *Sur l'espace architectural : essai d'épistémologie de l'architecture,* Paris, Dunod, 1971.

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5. Françoise Choay, *La règle et le modèle. Sur la théorie de l'architecture et de l'urbanisme,* Paris, Éditions du Seuil, 1980.

6. Michel Foucault, *Les Mots et les Choses*. Paris, Gallimard, 1966.

Michel Foucault, *L'Archéologie du savoir*. Paris, Gallimard, 1969.

7. Neil Brenner and Christian Schmid, "Towards a new epistemology of the urban?", *City*, n°2-3, v. 19, 2015, pp. 151-182.

8. Eugene McCann and Kevin Ward (eds.), *Mobile Urbanism: Cities and Policymaking in the Global Age*, Minneapolis, University of Minnesota Press, 2011.

9. Colin McFarlane, "Assemblage and critical urbanism", *City*, n°2, v.15, 2011, pp. 204-224.

10. Anne Coste, *Quel sens en architecture pour le polysémique terme de modèle ?*, 2008, [on line] https://hal.archives-ouvertes.fr/hal-00923363, retrieved on 25/05/2018.

11. *Id.*

12. About the interconnected relationship between *model* and *type cf.* the voice *Type* in Antoine C. Quatremère de Quincy, "Type" In *Dictionnaire historique d'architecture, contenant dans son plan les notions historiques, descriptives, archéologiques, biographiques, théoriques, didactiques et pratiques de cet art.* Vol 2, Paris, Librairie d'Adrien Le Clere et C.ie, 1832, pp. 629-630.

13. Charles Jencks, *The Iconic Building - The Power of Enigma,* London, Frances Lincoln, 2005.

Leslie Sklair, *The Icon Project. Architecture, Cities and Capitalist Globalization,* New York, Oxford University Press, 2017.

14. The relationship between the imitation of nature and model recurs frequently in a long article which Quatremère de Quincy dedicates to the word *imitation* in its *Dictionnaire d'architecture (Op. cit.):* "*Chaque art trouve à imiter dans la nature un modèle général ou commun à tous, et un modèle qui lui est particulier.*"

15. The Latin word *modus* refers to the concept of measure, while *modulus* enriches the concept of measure by hinting at the idea of rule, as standard or rhythm, applied to measure in artistic fields (architecture, poetry, music). *Cf.* Peter G.W. Glare (Ed.), "Modulus", in *Oxford Latin Dictionary*, London, Oxford University Press, 1968, p. 1124; Peter G.W. Glare (Ed.), "Modus", in *Oxford Latin Dictionary*, London, Oxford University Press, 1968, pp. 1124-1125.

16. Suzanne Bachelard, "Quelques aspects historiques des notions de modèle et de justification des modèles", in Pierre Delattre and M. Thellier (Eds.), *Élaboration et justification des modèles*, Paris, Maloine, 1979, pp. 3-19.

17. François Jullien, *Traité de l'efficacité*, Paris, Grasset, 1996, p. 18.

18. « *Nous dressons une forme idéale (eidos), que nous posons comme but (telos), et nous agissons ensuite pour le faire passer dans les faits. Tout cela irait de soi – but, idéal et volonté : les yeux fixés sur le modèle que nous avons conçu, que nous projetons sur le monde et dont nous faisons un plan à exécuter, nous choisissons d'intervenir dans le monde et de donner forme à la réalité* » (*Id.*, p. 15)

19. Roman Frigg and Stephen Hartmann, "Models in Science", in Edward N. Zalta, *The Stanford Encyclopedy of Philosophy,* 2018, [on line] https://plato.stanford.edu/archives/sum2018/entries/models-science/, retrieved on 18/06/2018.

20. Michel Armatte, "La notion de modèle dans les sciences sociales : Anciennes et nouvelles significations"», *Mathématiques et Sciences Humaines,* n°172, 2005, pp. 91-123.

21. Suzanne Bachelard, *op. cit.*

22. Serge Diebolt, cited in Damien Claeys, *Architecture et complexité : Un modèle systémique du processus de (co)conception qui vise l'architecture,* Louvain, Presses universitaires de Louvain, 2013, p. 75.

23. Michel Armatte, *op. cit.*

24. Shumi Bose, Sasha Cisar and Nicholas Lobo Brennan, "Editorial"., in *Models Ruins Power. Issue 1 We Live in Models,* 2014, p. 6

25. Anne Coste, *op. cit.*, 2008.

26. Peter Carl, "Death and the Model", *Models Ruins Power. Issue 1 We Live in Models*, 2014, pp. 104-114.

27. *Id.*, p. 105.

28. Anne Coste, o*Op. cit.*, 2008.

29. Philippe Boudon, *op. cit.*, 1971.

Philippe Boudon, *op. cit.*, 1975.

30. François Jullien, *op. cit.*

31. Marc-Antoine Laugier, *op. cit.*

32. Wolfgang Herrmann, *Laugier and Eighteenth Century French Theory,* London, A. Zwemmer Ltd, 1962.

Fabio Restrepo Hernández, *Ceci est mon testament : Marc-Antoine Laugier,* doctoral dissertation, Barcelona, Universitat Politècnica de Catalunya, 2011.

33. Marc-Antoine Laugier, *op. cit.*, pp. 12-13.

34. In reference to the use of the term model in Laugier's *Essai sur l'Architecture* see also the preface: "*Nous avons divers Traités d'Architecture qui développent avec assez d'exactitude les mesures & les proportions ; qui entrent dans les détails des différent ordres, qui fournissent des modèles pour toutes les manières de bâtir*" (p. iii).

35. Wolfgang Herrmann, *Laugier and Eighteenth Century French Theory,* London, A. Zwemmer Ltd, 1962.

36. See also André Corboz, "La posterità del Tempio di Salomone : iconografia e architettura", in Carlo Cresti, *Massoneria e architettura, Convegno di Firenze*, Foggia, Bastogi,1988, pp. 267-269.

37. Richard Krautheimer, "Introduction", in *Iconography of Mediaeval Architecture, Journal of the Warburg and Courtauld Institutes,* v. 5, 1942, pp. 13.

38. For an analysis and a critique of the search for an epistemological foundation for architectural discourse, which began during the '60s-'70s, *cf.* Christian Girard, *op. cit.*

39. Michel Foucault, *op. cit.*, 1966.

40. Michel Foucault, *op. cit.*, 1969.

41. Christian Girard, *op. cit.*

42. Françoise Choay, *op. cit.*

43. Choay, *id.*, p. 9, opens her book stating that: "*Ce livre est consacré à l'espace édifié et à la ville.*"

44. Choay underlines that the foundation of an autonomous theoretical discourse on the built environment, its instauration through the two founder texts, is rooted in the history of Western thinking - the Renaissance intellectual revolution, in particular. It would be interesting to deepen

a parallelism between the birth of an autonomous discipline on the built environment rooted in the Western culture explored by Choay and the different strategies of thinking in Western world, with the centrality of modelling, and in China examined by Jullien, *op. cit.*

45. Ola Söderström, "Des modèles urbains 'mobiles'", *Urbanism*, n°383, 2012, pp. 43-46.

46. Françoise Choay, *op. cit.,* p. 22.

47. *Id.*, p. 164.

48. It is relevant to observe that also in Philosophy, in regard to the ontology of models in sciences, the distinction model-description is debated. The voice "Models in Science" of *The Stanford Encyclopedia of Philosophy* includes "descriptions" among models' types, although the authors themselves express criticality, since: "we can describe the same thing in different ways. But if we identify a model with its description, then each new description yields a new model, which seems to be counterintuitive" Roman Frigg and Stephen Hartmann, *op. cit.*.

49. Françoise Choay, *op. cit.,* p. 46.

50. Choay describes this process as "*stade du miroir et stade de l'utopie*", *id.*, p. 178.

51. *Id.*, p. 174.

52. Vittorio Gregotti, *Il territorio dell'architettura*, Milano, Feltrinelli, 1966.

53. *Id.*, pp. 18-19.

54. *Ibid.*

55. Shumi Bose, Sasha Cisar and Nicholas Lobo Brennan, "Editorial", in *Models Ruins Power. Issue 1 We Live in Models*, 2014, p. 7.

56. Among the different texts where Philippe Boudon has discussed for more than 40 years his theoretical view on space, architecture, architectural conception and its epistemology we list:

Philippe Boudon, *Sur l'espace architectural : essai d'épistémologie de l'architecture,* Paris, Dunod, 1971.

Philippe Boudon, *Architecture et architecturologie*, 4 vol., Paris, AREA, 1975.

Philippe Boudon, *Introduction à l'architecturologie.* Paris, Dunod, 1992.

Philippe Boudon, *Conception.* Paris, Les Éditions de La Villette, 2005.

Philippe Boudon, *De l'architecture à l'épistémologie : la question de l'échelle.* Paris, PUF, 1991.

57. Philippe Boudon, *op. cit.*, 1971.

58. Philippe Boudon, *op. cit.*, 1975.

59. Philippe Boudon, *op. cit.*, 1975; Christian Girard, *op. cit.*

60. The notion of system in Boudon's work comes from linguistics, in particular from de Saussure.

61. The scale is indeed one of the most important concepts in the architecturological system, the first scientific concept of architecture. Its function is to rule the shift from the space of conception, *espace de conception***,** to the space of construction, *espace d'édification.* While the proportion operates only an operation of dimensioning, a purely geometrical operation, the scale operates a dimensioning referring to external factors (the context for instance). In this aspect, geometry and architecture differ: the first has as its proper instrument, the proportion, the second, the scale. In addition to Boudon's bibliography, *cf.* Damien Claeys, *Architecture et complexité : Un modèle systémique du processus de (co)conception qui vise l'architecture*, Louvain, Presses universitaires de Louvain, 2013.

62. In *Les Mots et les Choses* Foucault (*op. cit.,* 1966) introduces the notion of *episteme*, the historical, *a priori* conditions of possibility ("*conditions du discours*") which ground the culture, all knowledge, and its discourses in a particular epoch...

63. Philippe Boudon, *op. cit.*, 1975, v. II, p. 8.

64. Philippe Boudon, *op. cit.*, 1975.

Christian Girard, *op. cit.*

65. Christian Girard, *op. cit.*

66. Jacques Lucan, "La forme et la répétition", *AMC Architecture Mouvement Continuité*, n°47, 1978, pp. 49-52.

67. *Id.*

68. *Id.*, p. 51

69. *Ibid.*

70. Philippe Panerai, Jean Castex and Jean-Charles Depaule, *Formes urbaines : de l'îlot à la barre*, Paris, Dunod, 1977.

71. Karl Kropf, *Handbook of urban morphology*, London, Wiley, 2017.

72. John Christopher Jones, *Design Methods: seeds of human futures*, London, John Wiley & Sons Ltd., 1970.

73. Christopher Alexander, *Notes on the Synthesis of Form*, Cambridge MA, Harvard University Press, 1964.

74. Christopher Alexander, Sara Ishikawa, Murray Silverstein, *A Pattern Language: Towns, Buildings, Construction*, New York, Oxford University Press, 1977, p. XV.

75. Christian Girard, *op. cit.*

76. *Id.*

77. *Cf.* the monographic issue "Les modèles urbains entre courants, références et performances" in *Lieux communs*, n°14, Devisme and Dumont, 2011, and the dossiers "Modèles urbains", *Urbanism,* n°383, Söderström and Paquot, 2012; "We Live in Models", *Models Ruins Power*, issue 1, edited by Bose, Cisar and Brennan, 2014; "Stratégies de villes et 'modèles' urbains : approche économique et géopolitique des relations entre villes", *EchoGéo*, n°36, Peyroux and Sanjuan, 2016.

78. For instance: *Modèles, références et analogies dans les conduites à projet,* ENSAG, Grenoble, February 2008, organised by Anne Coste et Marie-Astrid Creps; *La notion de modèle en architecture : du Moyen-Âge à nos jours*, INHA, Paris, October 13th 2016, organised by Charlotte Duvette, Justine François, Alison Gorel le Pennec et Léa D'Hommée-Kchouk.

79. A particular and interesting case is represented by the exhibition, and its catalogue, *Paris Haussmann. Modèle de ville*, held at the Pavillon de l'Arsenal, Paris, January 31st- June 4th 2017, curated by Benoit Jallon, Umberto Napolitano and Franck Boutté.

80. Neil Brenner and Christian Schmid, *op. cit.*

81. Eugene McCann and Kevin Ward (eds.), *Mobile Urbanism: Cities and Policymaking in the Global Age*, Minneapolis, University of Minnesota Press, 2011. Söderström and Paquot, for instance, explicitly indicate the work of McCann and Ward as an underpinning the research field related to the papers contained in the dossier they curated. See Ola Söderström and Thierry Paquot, "Modèles urbains", *Urbanism*, n°383, 2012, pp. 41-42.

82. Eugene McCann and Kevin Ward, *op. cit.*, p. xviii.

83. Ola Söderström, "Des modèles urbains 'mobiles'", *Urbanism*, n°383, 2012, pp. 43-44.

84. *Id.*, p. 44.

85. Elisabeth Peyroux and Thierry Sanjuan, "Stratégies de villes et 'modèles'" urbains : approche économique et géopolitique des relations entre villes", *EchoGéo*, n°36, 2016.

86. *Ibid.*

87. Laurent Devisme and Marc Dumont, "Des modèles urbains, pour quoi faire ?", *Lieux communs. Les cahiers du LAUA*, 14, 2011, pp. 10-21.

88. Françoise Choay, *op. cit.*

89. Elisabeth Peyroux and Thierry Sanjuan, *op. cit.*

90. Anne Coste, *op. cit.*, 2008.

91. "*Nous allons voire que cette apparente ambiguïté est elle-même porteuse de sens*", Anne Coste, *op. cit.*, 2008.

92. Anne Coste, "Le modèle en architecture. Entre rétrospective e prospective", *Les Cahiers de la recherche architecturale*, n°40, 1997, p. 19.

93. Thierry Paquot, "Ce que la mondialisation fait aux lieux", *Urbanism,* n°383, 2012, pp. 70-72.

94. *Id.* p. 70. The "three times of globalisation" identified by Paquot are: first, starting in the XV century crossing the Renaissance Age till the Scientific Revolution; second, corresponding to the

Industrial Revolution, between the end of XVIII century to the beginning of XX; and third, our age, characterised by the Digital Revolution.

95. Benoit Jallon, Umberto Napolitano and Frank Boutté, *Paris Haussmann : Modèle De Ville/A Model's Relevance*. Paris/Zürich, Éditions du Pavillon de l'Arsenal/Park Books, 2017, p. 10.

96. It is relevant to observe that the subtitle of the catalogue *Paris Haussmann* in French is "*Modèle de Ville*", while in English is "*A Model Relevance*". Hence, there is not a perfect coincidence in the two, but the first adds something to the second: a model of a city still with relevance.

97. Among them: flexibility, walkability, standardisation, modularity, reversibility, high density.

98. Anne Coste, *op. cit.*, 1997 and 2008.

99. Thierry Paquot, *op. cit.*

100. Benoit Jallon *et al.*, *op. cit.*

101. Anne Coste, *op. cit.*, 2008.

102. Thierry Paquot, *op. cit.*

103. Benoit Jallon *et al.*, *op. cit.*

104. Anne Coste, *op. cit.*, 1997.

105. Anne Coste, *op. cit.*, 1997 and 2008.

106. Thierry Paquot, *op. cit.*; Benoit Jallon, Umberto Napolitano and Frank Boutté, *op. cit.*

107. Benoit Jallon *et al.*, *op. cit.*

108. Vittorio Gregotti, *op. cit.*

109. Françoise Choay, o*Op. cit.*

110. Colin McFarlane, "Assemblage and critical urbanism", *City*, n°2, v. 15, 2011, pp. 204-224.

111. Neil Brenner and Christian Schmid, *op. cit.*

ABSTRACTS

This article investigates the theoretical legacy of the notion of model in architectural and urban discourse. This concept is characterised by a bundle of meanings, sedimented during a longstanding evolution, and by a never interrupted debate around it. The contribution will retrace the roots of the concept of model and will outlines some highpoints of the discussion, in particular in the 1970s when model became crucial in the epistemological discourse on architecture, till the recent heterogeneous resurgence. In fact, nowadays the notion of model, with its longstanding heritage, may be an effective and still up to date device to study the contemporary conception and production of space in the global stage.

Cet article vise à explorer l'héritage théorique de la notion de modèle dans le discours architectural et urbain. Ce concept est caractérisé par une accumulation de significations, sédimentées pendant une longue évolution, et par un débat qui ne s'est jamais interrompu. Cette contribution retrace les origines du concept de modèle, en soulignant quelques moments de majeure intensité de la discussion, en particulier dans les années 1970 quand le terme modèle était devenu central dans le discours sur l'épistémologie de l'architecture, et jusqu'à sa récente et hétérogène réapparition. A présent, la notion de modèle, forte d'un long héritage, peut être un instrument efficace pour étudier la conception et la production de l'espace au niveau global.

INDEX

AUTHOR

FILIPPO FIANDANESE

Filippo Fiandanese is a PhD candidate in the Architecture, History and Project programme at the Polytechnic University of Turin. He is junior fellow at the China Room Research Centre, his research investigating the adoption of transnational models in the construction of a new town in the outskirts of Beijing. He is currently taking part in the international research program, CeNTO, on Chinese New Towns, and has published articles in international journals such as Casabella and Territorio.
filippo.fiandanese@polito.it