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Original Paper

Design Tools for New Dwelling Dynamics

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Abstract

The theme of Public Residential Building turned back to the center of the national debate. However, the reasons of this are attributable to not so favourable circumstances: we needed a pandemic lockdown to understand that the houses we live in, no longer meet our needs. Beyond the “symptomatology” more widely perceived as the lack of a balcony or a room, what a more careful eye has felt is the clear obsolescence relative to the home/house-system: for more than half a century, we continued to design residential spaces following standards and regulations little attentive to change and not calibrated on contemporary society. These are the reasons why we need an “house reform”, where design follows societal changes and revolutions such as globalization and digitalization, where therefore the fundamental paradigm could be “becoming”. In this perspective and applying the idea to the project, which became flexible and adaptable, Northern Europe can teach us how to think open and, mixing it with the Mediterranean resilience, we could propose a renovate design methodology for the new dwelling dynamics.

Keywords

home, housing precariousness, design, typology, mass housing, dialogue

1. Introduction

The last decade market data about Italian habits, shows a latent services reform that determines the time spent within (or out of) domestic walls. This trend describes a western progression to innovative systems, which both empty interiors in favor of dematerialization processes, and emphasizes hyper-technological envelopes. The consequence is the dominance of house market in a “fragmented” reality. This, leads to lose the project overall vision, apparently unified by interconnected solutions.

The “Covid-19” emergency, which confined people within their home, well represents these phenomena and mobilized many professional categories towards a deeper analysis of spatial

obsolescence; and if it is true that the “housing problem” solves in recognizable (Note 1) space data, is also true that it contains anthropogenic, technical, regulatory and innovative changing.

It is true that housing policies have been regularly conceived throughout the years: today finally our machine-à-habiter, like any other household appliance, consumes little and does not make noise; however, what is missing is a debate on what the house has become: is it a storage for our belongings? Is it the place where we feel safe and secure? Is it suitable for our lifestyle? Hard to answer.

Domestic spatiality has not been central for too long: the quantitative policy of the ‘50s and the qualitative of the ‘80s did not follow any reasoning as to what it would then become. Furthermore, in recent decades, everything that has had to do with the architectural project, from material choices to the technologies applied, had to be compared against the term sustainability, the meaning of which, despite trying to place it in a univocal defining apparatus, always assumes different shades. In actual fact, despite sustainability being elevated as mandatory track on which runs the locomotive of innovation, it remains unclear which line should be followed to change the way we build to meet its criteria and which approaches would be consistent with its paradigms.

After years of pressures on sustainable building, it is therefore necessary to reflect on the progress made and on how to carry forward the strategies of social housing.

It should also be noted that, in addition to socio-economic factors and when the housing problem has been raised, the architectural culture has done it with complex models (more quantitative than qualitative), sometimes with spatial and architectural experimental forms, which have helped to erase the inhabitants’ sense of belonging to a specific place, generating criticality not only relating to livability, but also to the habitability of the spaces and the durability of the architecture themselves.

We have a great opportunity today to question the project. Our homes are inadequate to the new needs, not to economic ones but to people, like elderly, immigrants, students, off-site workers, extended families and single parents. Moreover green standards are rarely met and parking spaces are quickly turned into more complex facilities soon after provision of the habitability certificate. Hence, it could be appropriate to intervene through not circumstantial solution but structural ones, as a superordinate *methodology* that considers general and specific factors: culture and society, rules and regulations, technology and innovation.

2. Method

The proposed methodology, called Dwelling Diagram, sees an analytical premise that find its roots in the thoughts of the futurologist Alvin Toffler and in the dissertations of N. John Habraken, therefore a purposeful phase aimed at experimental verification.

The second and third Tofflerian Waves are very interesting as they relate to the post-industrial periods/mass society and post-digitalization/global society; it is precisely within these contexts that the Habraken’ Support-Infill-theory is born and evolves, systematising the western and eastern world, industrialized and not, with a clear house policy ruled by DIY.

The analyses do not develop according to a historiographical but critical approach, which takes into account the social, political, economic and architectural events that have overlapped in a given historical period. Hence the research proposal that, by placing man and domestic spatiality at the center of the debate and taking into account the living past, articulates by relating the living today and the living tomorrow with the intention to question the concept of and related themes, and to intercept the market trend and the international debate.

3. Result

Proposing the Dwelling Diagram as an innovative way of approaching design, we aim to address the project to a new circular life, including social, spatial and technical aspects.

The expected results see the prefigure of *dwelling paradigms* and *scenarios* in constant evolution. *Scenarios*, specifically, are configured as *probable situations*, ending and starting point for a new application of the Dwelling Diagram, circular design tool.

The objective is to establish what is the system of principles that animate the project today and whether it is exclusively aimed at greater attention to and protection of the users' health and the environment or whether it also concerns social and economic issues that presuppose a widespread change necessary to the protection of future generations. The spatial and technological implications cannot be separated from this choice.

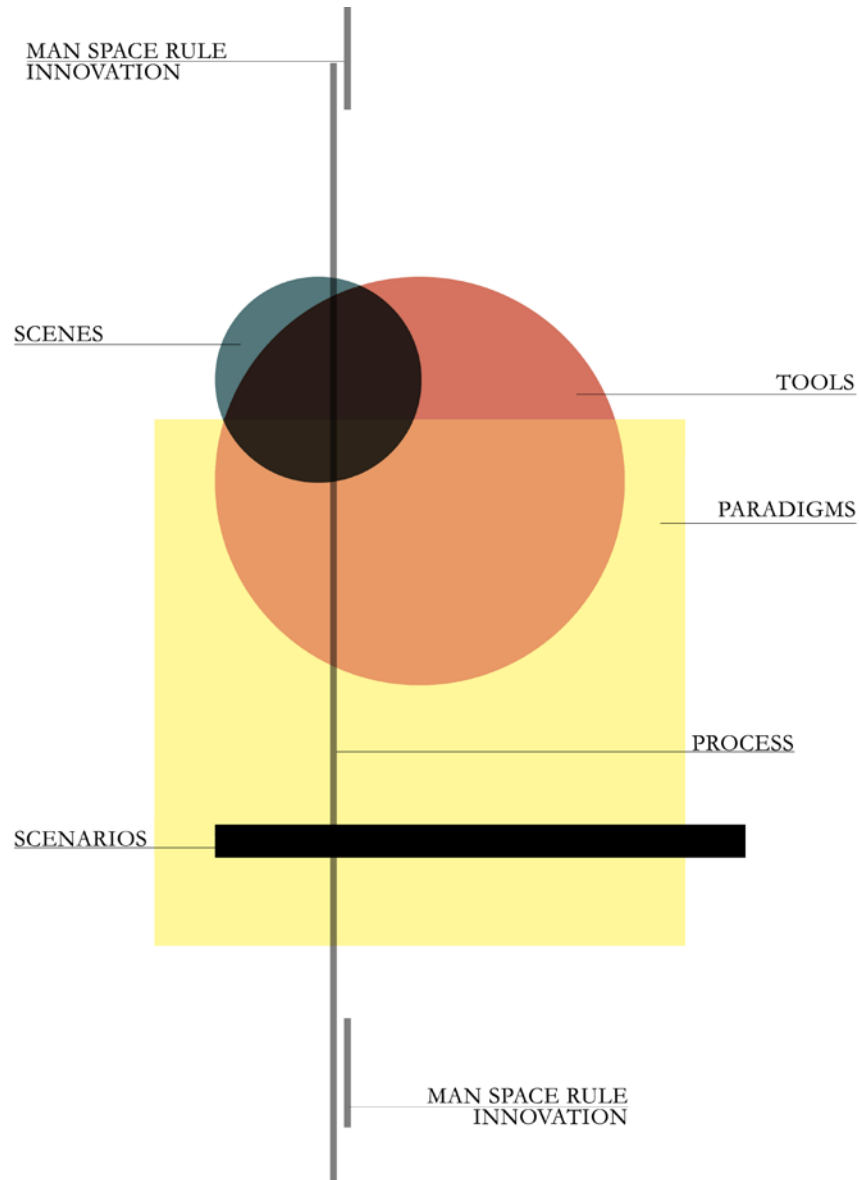


Figure 1. The Dwelling Diagram, General Scheme

4. Discussion

“It is clear that the house is not an object, a building, but a widespread and complex condition that integrates memories and images, desires and fears, the past and the present” (Pallasmaa, 1992).

The outlook of today’s housing question can be partially synthesized in a form of precarious housing, in which regard we can probably intervene only through a *structural reform of housing*; to do so, however, we must start from its semantics, reading the living space as a moment of convoy between history, traditions, cultures (as well as social and architectural experimentation) and as point from which to start again to solve recurrent mistakes and obsolescence.

The state of fact sees noticeable criticalities variably contributing to obsolete or inadequate spatialities. From a strictly constructional point of view, one can essentially notice an overload of residential housing consisting of standardized cells and a repetition of low-quality and unregistered DIY types. The social aspect includes a combination of a high rate migration with abandonment of the areas of origin and overcrowding of the areas of destination alongside with changes in the socio-economic sphere, lifestyles and working patterns, as well as in the conception of space, time, connection and relation. To address these situations and find answers that guarantee healthiness, well-being and comfort, we use technical, technological, material, innovative and programmatic strategies, architecturally and spatially translated into modules (ancestors of standardization) or *type*. Despite the innovations, the *typology* is a fixed entity in constant evolution. This “category of living”, is a complex and stratified phenomenon, characterized by a form of spontaneity in living it -connoting the living space with no specific definition other than “home”-; it is regulated by systems dependent on the social background, and ought to be interpreted as the element of dialogue between space and person, between a specific place and its traditions, expressed in clear spatial distributions and responding to the need for adaptability in time, as well as often element of DIY.

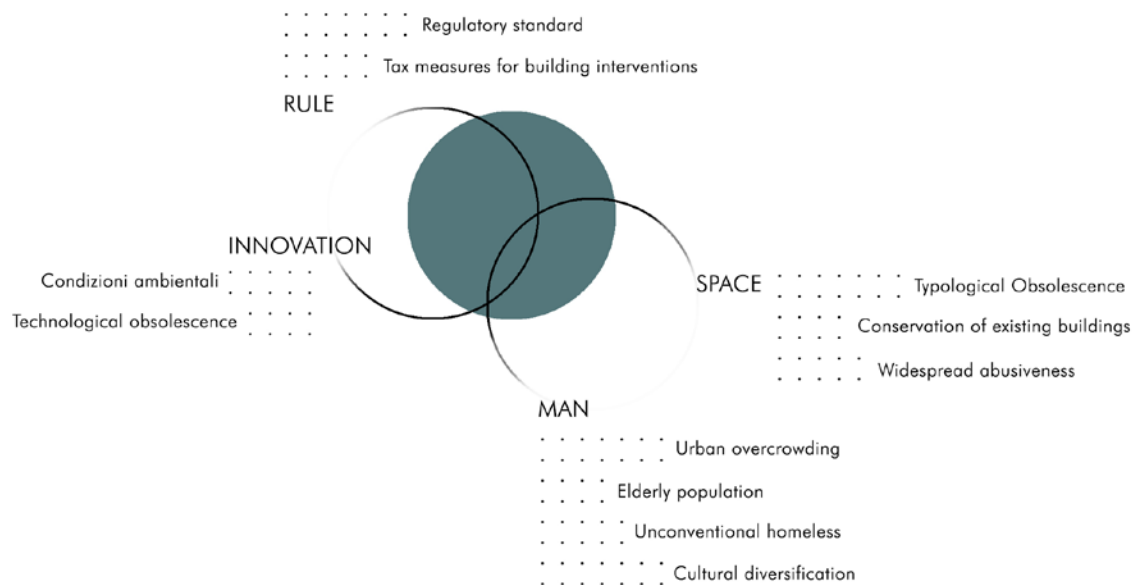


Figure 2. Scenes of Dwelling Diagrams

But if it is true that the geographies most predisposed to types and regimes of DIY are indigenous or overpopulated, it is also true that the twentieth century has conceived the typology of the apartment, which, unlike “DIY”, falls within the spatialities designed “a priori” and that therefore place process and project at the same level of importance. As Habraken argues, control, division of responsibilities and tasks and negotiation, play an essential role and produce public housing as a response to housing issues. The response of Modern Movement to *mass society*, was *mass housing*, too. But today, to the

victory of customization on standardization and under the regime of globalization, the challenge is to respond in a short time and with high quality standards to the multiplicity of ever-changing needs of an atypical user when compared with the citizen-type, the family-type, the accommodation-type of 1900, wanting to *predict what cannot be foreseen*.

The paradigm is: **becoming**.

In the 1970s, Habraken set up a theoretical apparatus which, using the diagrammatic instrument, is proposed as a possible intervention strategy: *Support-Infill* (Note 2) theory, born between the Indonesian and the Dutch soil and strongly focused on the architecture participatory, becomes the basis for a series of experiments around the world, translating into regulatory interventions, design or, again, strategic ones.

Rereading the *dwelling* by accepting the *becoming* flow and giving an order that allows a grammatical analysis and a logic, guarantees the acquisition of different points of view that, as in the theory of Habraken, trigger different questions on the same issues, therefore eliciting different answers: *in a context in which maximum **adaptability** and **variability** are required, how can we design large buildings without standardizing and stiffening the design schemes?* (Note 3)

An answer to this question can be read in the most complete and structured interpretation of the S-I theory: it is the **Open Building** approach, proposed and carried out by the American Stephen Kendall and the novice same-named *Collective*.

From the 80s to today, Open Building whilst carrying out research in its headquarters, (refined by S.A.R. (Note 4)) has then been successfully experimenting the theoretical results all over the world, especially in Holland, Africa, China and Japan.

These experiments validate the S.-I. theory, the O.B. approach, and their translation in designer/user tools. For example they produced *technological* solutions for releasing the plant and making each accommodation independent, or double floor packages and equipment cabins, or design software; also, they obtained *regulatory* solutions such as the “Technical Regulation for the engineering of assembled types” (Beijing, 2014), the law approved by Japanese Government in 2008; then, they designed *technical* proposals such as the «design and evaluation standards for long-term sustainable construction» (China Institute of Building Standard Design and Research—CBS, 2018), or the *instruction manual* (Note 5), attached to Open Building accommodations and delivered with the keys and the 3-year warranty.

In other words, Habraken and Open Building treat comprehensively the housing issue, declining the **design** as a unitary formula that uses multidisciplinary to configure itself theoretically, strategically and projectually. The *temporal* data used in this research also emphasizes the pre-existence of the problem, which has been noted, reported and investigated extensively over the last half century but is also frequently overshadowed by very noisy and allegedly resolute solutions.

The advent of the Pandemic (2020) has demonstrated once again how often there is a *need* of an emergency/catastrophic situation to silence the noise and bring to light the priorities: one of these is

undoubtedly the obvious malaise linked to everyday life, and manifested through the constant demand for alternatives up to the state of social impatience. We wonder if an intervention should not come from the architectural project, if the responsibility is attributable to the designer and to the **residencial design**, today evidently trapped into an *obsolete regulatory-space system*.

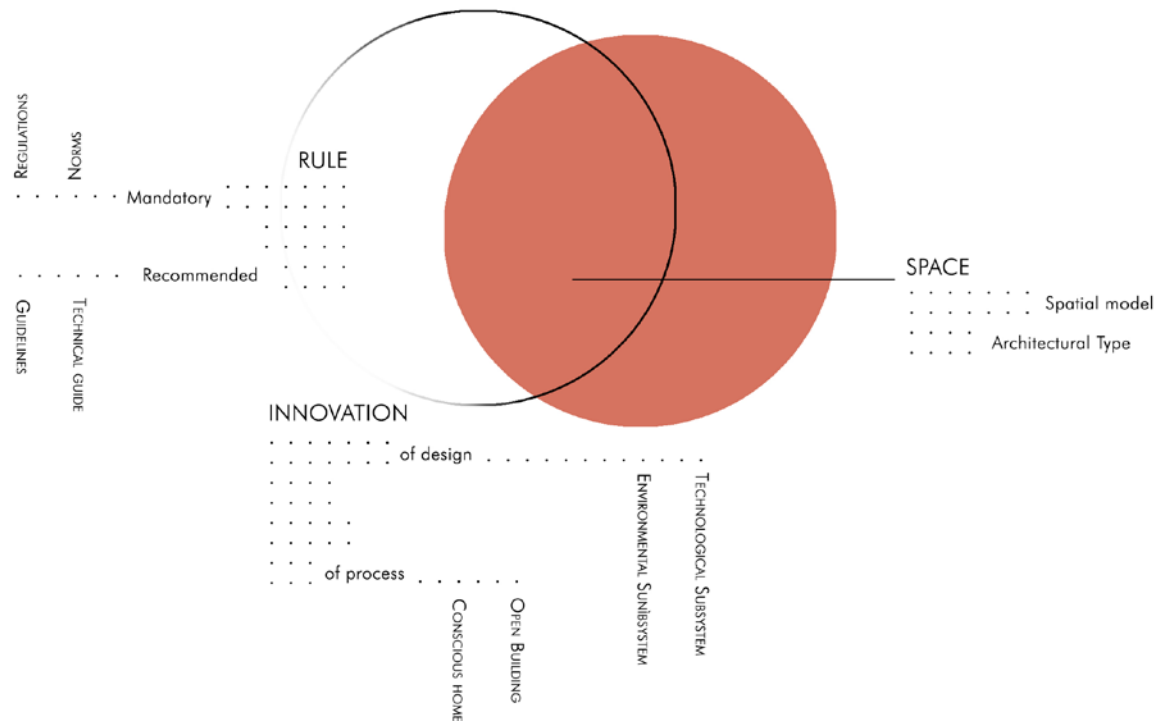


Figure 3. Tools of Dwelling Diagrams

To intervene on the residential reality is not a small thing if we consider the quantity of variables and factors that contribute to it. At this point we must consider both the Open Building approach (as a solution) and its inappropriateness to westernized contexts such as Italy (mainly attributable to the investment costs required, as well as to the conservative attitude that characterizes our culture). Thus, we propose an alternative: a methodology that, while maintaining an overall view, calls into question the current house design by proposing a *flexible, adaptable* version, a sartorial design that integrates in the processes **fluidly**, proper to the human being and society. That is a **Dwelling Diagram**.

The choice of diagram as *tool* lies in its nature, consisting in that “operative-conceptual device that does not imply an initial formal preconception, but rather a generative strategy, with variable and unpredictable formal outcomes” (Note 6).

This approach wants to make use of a step sequence, made of actions and based on four fundamental and immutable paradigms: *adaptability, flexibility, contextuality* and *resilience*.

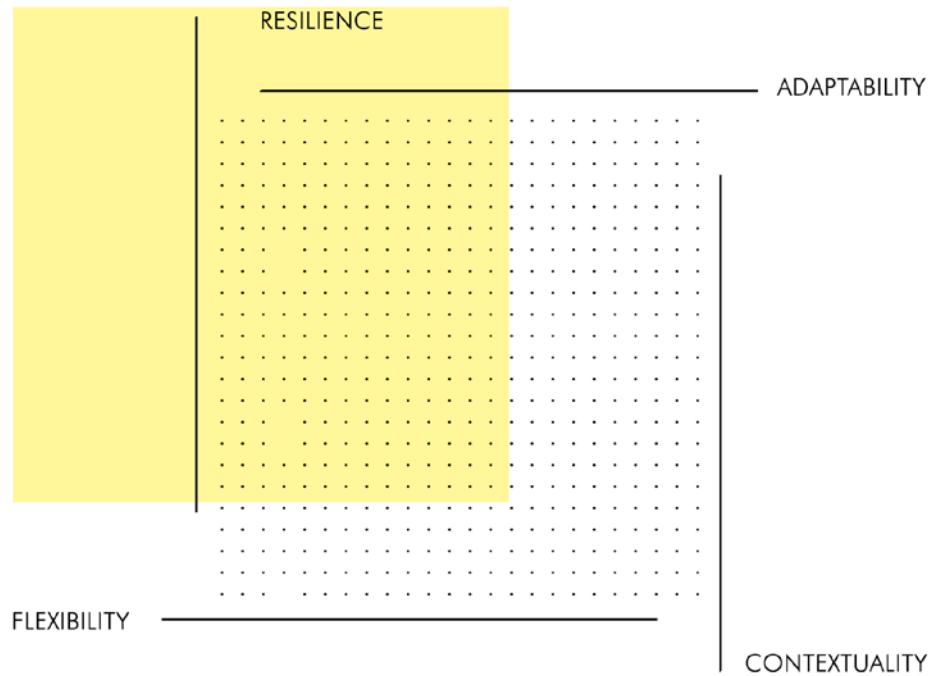


Figure 4. Paradigms of Dwelling Diagrams

Identifying, first phase of the design process, sees the identification of the category of interest related to residential artifacts, more specifically the identification of the object: *existing real estate* or *new buildings*.

Knowing. The (historical and environmental) contextualization implies the existence of fundamental data for the identification of the “**support**” and the “**infill**” categories. The goal is to know which elements of the artifact belong to which category.

(Re)configuring. Following the definition and elaboration of the *transformative objectives*, we proceed with the “new” identification, the configuration, and the spatial location of **support**—according to the existing categories or to a new one.

Drawing. Established the *constraints*, coinciding with the identification and placement of the *support* and with the specific users’ needs framework, the project phase is carried out, consisting of the **infills** configuration and spatial placement. Considering *the traditional way of doing* (that marks the space into *rooms* duly *measured* and *furnished* to ensure the pre-established functions) thus **overturning principles and procedures**, the result will be a *scenario*. The principles that will guide the design will be *identification* and *placement* firstly of the *actions*, then of the complements and/or of the objects that allow its development.

Choosing. For this phase we prefer to use graphic elaborations starting from the state of fact that represent and anticipate **possible future scenarios**. In coherence with the Diagram principles, the *scenario* on which the choice falls will not be exempt from the possibility of modifications. Indeed,

belongs to this phase the elaboration of possible modifications starting from the “in existence” scenario.

Realizing. Once completed study, analysis, and design, we proceed with the execution of the work.

Dwelling. Clarified the role of the designer as “third interlocutor” (house-inhabitant) and the value of the dialogue-relational aspect of the contemporary *Dwelling*, it is fundamental the constant acquisition (monitoring and questionnaires) of data, relating to the followings: state of health and degree of users’ well-being/ satisfaction, building state of health and its ability to respond to people needs, changeover of different needs related to the same user/to different users (reconfiguration of the parts and/or the whole). Part of this phase is made up by the interventions that partially modify the building. **Monitoring** is essential (defining time and space) according to the scheme (needs-requirements-classes-systems) reworking.

UnInhabiting. *Circularity* leads the architecture to fall within a logic of reversibility, that also concerns the end of the life of the building: it coincides with a final investigation that measures the theoretical intentions, in relation to what happened throughout the useful life of the project. We propose evaluation questionnaires to all the actors who have been part of the various phases of implementation-management and, if deemed necessary, we acquire suggestions and proposals. The aim is to draw up -in the next step- a synthesis report. As already mentioned, the validity of the proposal is expressed essentially in relation to the *time factor*. For this reason, the proposed model is considered valid and the requirements met if some conditions are fulfilled.

Restarting. The final moment is translated into a **document** -to be processed by the designer- which contains a synthesis of some data such as processes of ideation, implementation and operation, disposals. All the information is grouped in a qualitative/quantitative time balance sheet aimed to *improve and/or correcte the procedural methodology*, to then be adopted for future interventions. The synthesis report represents the end of one use of the Diagram and the beginning of the next one. For this reason, the tool is *open source*, making use of the designers’ contributions for acquiring it, update it and improve it.

The innovation of the *Dwelling Diagram*, therefore, lies in overcoming the traditional design approaches and management of Residential Building as well as participatory processes, proposing itself as a dynamic and circular synthesis. The problem of Open Building adoption, mainly found in implementation costs, would be solved by the application of the procedural model to the *public* scale, providing for long-term investments and triggering a regeneration process of construction market, in line with the objectives of the *2030 Agenda for Sustainable Development* - n. 9, 10, 11, 13, 16.

5. Conclusion

In conclusions, the meaning of “home” is no longer traceable only to the traditional model, where is synonymous of *permanence* and *stability*. The *contemporary home* is increasingly becoming a “temporary” home, an emblem of the fluidity that characterizes our era.

Today, the design of the living space also becomes the *design of precariousness*, raising the issues of the multiplicity of living recognition and of the interactions that space is able to establish with the elements.

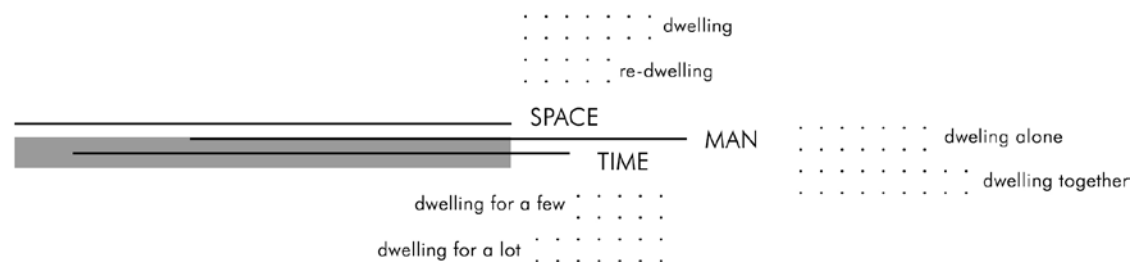


Figure 5. Scenarios of Dwelling Diagrams

In this scenario, the proposed Diagram can be an extraordinary tool for understanding and evaluating the real compliance of the house with the needs of inhabitants. Technological, spatial, and functional choices become strategic to the definition of a project that does not correspond to the composition and to the identity of the places. This means to proceed through *variants and invariants*, guaranteeing both a rigorous design approach in the fundamental characteristics (Invariants) and flexible features (Variants) that can qualitatively characterize the project.

This process cannot renounce to the involvement of the inhabitants in all stages of its implementation; therefore, a more attentive regulation of the housing functions is needed.

It is necessary, however, to specify that this is not enough to make a project:

“Architecture is not a science. Architecture is a wonderful synthesis process in which thousands of human components are involved: it remains architecture. Its mission is still to harmonize the material world with life. Making architecture more human means making architecture better and also means widening the concept of functionalism beyond the limit of the technique [...]. Architectural methods sometimes resemble scientific processes; research methodologies, as well as for science, can be adopted for architecture. Research itself may become progressively more analytical, but the substance can never be only analytical. In architectural research intuition and art will always take over” (Aalto, 1940).

Of course, the problem remains open. We can leave the current phase only with the assumption that there can be no seriously managed legislation without proper experimentation, without real quality control under actual operating conditions and without adequate technical support information.

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Notes

Note 1. Aware of its own history and its own connotation, for example the spatial-temporal values of the threshold, the attic and the cellar and the ritual characteristics of the kitchen and bathroom, which also belong to the cultural and phenomenological spheres, as well as the renewed role of semi-permeable places -those between the outside and the inside, the envelope and the space- such as balconies, loggias and terraces.

Note 2. Habraken, 1961.

Note 3. N. J. Habraken, “The Control of Complexity”, 1987.

Note 4. *Stichting Architecten Research*, or *Architects Research Foundation*, founded by Habraken in 1965.

Note 5. “These books will allow residents to use the building for 100 years without involving the original architects and builders—‘Osaka Gas Experimental Housing: NEXT 21,’ 2007. In addition, on the ground floor was established a testing laboratory of the filling system, public: it was opened to all residents to test and master various types of filling components in different locations of the house. As a result, residents can update their knowledge and get what they need in tune with the latest technology. ” (Yingying, Jiang & Jia, Beisi, “The tendency of the ‘open building’ concept in the postindustrial context”, 2010).

Note 6. G. Di Cristina, 2006.