The Enabler Architect: Social Housing Through a Spectrum of Participation

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Social housing refers to low-income housing projects provided or subsidized by the state. This paper explores an approach for the design and conception of social housing incorporating open building, self-help, and participatory design aimed toward providing user autonomy. Moreover, it addresses the current role of the architect in the field. The study developed a theoretical analysis using two research methods: logical argumentation and case studies.

Two representative projects from architects that have globally impacted the housing discourse serve as case studies for investigation: Maison Dom-Ino (1914) by Le Corbusier and Quinta Monroy (2003) by Alejandro Aravena. The selection of the architects and their projects observed their influence on critical changes in social housing discourse. These changes occurred approximately every thirty years under a timeframe from 1914 to the present time. These architects appear in literature as essential figures whose ideas, theories, and projects historically influenced social housing production worldwide.

The case studies' examination followed two structured phases. Phase one focused on constructing each project's "macro" picture, creating a matrix of categories and distributing the evidence amongst them, investigating the following aspects: historical context, site context, and architectural theory. Phase two concentrated on composing the "micro" picture: developing a project analysis and evaluating architectural drawings and other artifacts through a soft & hard scale system, generating data displays that measured each case study's performance under a participation spectrum.

Findings show the frame as a persistent element amongst the case studies that can serve as a vessel encompassing open building, self-help, and participatory design. Furthermore, the results suggest that architects must act as enablers, users as collaborators, and the frame as their mediator, composing three forces acting within the social housing design.

> In reality, the prospect which seems very interesting to me is that of taking architecture away from the architects and giving it back to the people who use it. (...) *The designer's job is no longer to produce finished and unalterable solutions, but to extract solutions from a continuous confrontation with those who will use his work.* (...) A work of architecture, besides improving the material conditions of those for whom it is built, *should facilitate the human need to communicate through self-representation.*
>
> —Giancarlo de Carlo, *An Architecture of Participation*

INTRODUCTION

In the context of housing, the Modern Movement's concepts in the schools of architecture envisioned the architect as an individual who possessed all the necessary skillset concerning social housing as their forefront pedagogy. This tradition historically shaped the typologies developed by architects and engineers, who invested in an educational model that thinks and designs housing solutions aimed only at finished products. Although these products may adequately fulfill the desires and reality of its residents, there is no guarantee that these architectural solutions will evolve along with its residents' needs and societal changes on domesticity.

Design and development of open building systems and customization of housing have been for many years a part of several architects and researchers' pursuit of feasible solutions[1]. These strategies aimed to solve housing demand, industrialization and customization "without falling in the repetitious ploys of mass production"[2]. Nevertheless, most contemporary architects still need to embrace the inherent capacity of indeterminacy that exists within a design, especially in social housing[3].

The inclusion of open building, self-help, and participatory design in social housing projects can have the potential to optimize urban, typological, and social conditions of future designs. By allowing decent living conditions, a design-oriented policy serves as an economic mechanism to overcome poverty[4]. By including these theories as critical elements of architectural education, schools will be training the new generation of architects to position themselves as enablers of the design rather than sole

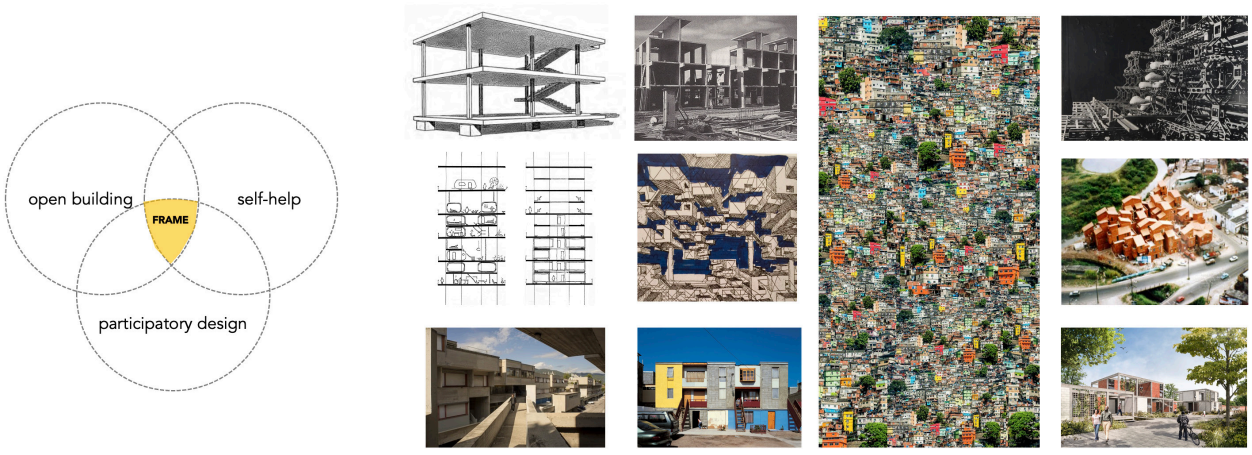


Figure 1.Elements of participation that can lead to autonomy in social housing and several projects that apply them. Image by the author.

authors of housing projects. In the social sphere, it will amplify the possibilities for the dissemination of architectural culture for the 98% of the population[5] within a framework and reinterpretation of the dwelling more grounded to the reality and free from architectural bias and aesthetic pressure.

This paper aims to discuss the role of architects by establishing a framework of participation elements applied to social housing design allied with a discussion of the architect's role. It places enablement at the core of the architect's agency and responsibility and discusses a pedagogical approach to social housing design that is focused on empowerment and user autonomy rather than aesthetics and finished products.

ARCHITECTS DISCOURSE ON HOUSING: FROM PANAMERICANS, TO MODERNS, TO DISRUPTERS

Discourse regarding the social function of the architect in social housing can be traced back to the Pan-American Congresses of Architects, which started in 1920 and continue to happen until today in Latin America. Amongst their discussions, a reflection concerning theories would be later examined in Europe, in the Congresses of Modern Architecture (CIAMs). These topics featured an awareness of urban planning issues due to the development of cities, the question of housing, the proper regulation of the architectural profession, and the model of pedagogy applied in the schools of architecture [6].

Later, in the CIAM of 1929 realized in Frankfurt, the subject of "Minimum Housing" posed architects with the question of how to manage the alarming housing deficit that emerged after World War I [7]. The responses were varied, with one thing in common: the view of the house as a flexible but reduced space, where only the utmost essential should be considered. Giancarlo De Carlo, a member of the TEAM X compared the contribution offered by the architects in the Congress to a prescription: "the remedy prescribed was the construction, possibly in series, of cheapest possible housing. It was reduced to the absolute minimum tolerable in terms of floor area; a minimum referred to as 'existential"[8]. The existential concept proposed by the architects at CIAM had a great potential in fostering solutions that would challenge the issues of social housing deficit and rise above them. However, since them, houses "became cultural alibis for the most ferocious economic speculation and the most obtuse political inefficiency" [9]. The combination of the discussions realized both in the Pan-American Congresses, and the CIAM creates a moment of impact in architecture because it represented the realization of the social agency of architects, and how they could contribute meaningfully in pressure matters of society.

In contrast, also in Europe, the Ob'edineniye Sovremennikh Arkhitektorov – OSA (Union of Contemporary Architects) founded in 1925 in Moscow, understood that architectural skills were "central to the definition and construction of social questions and new ways of life and living"[10]. Before Turner use the term enabler in 1985, the OSA disseminated the "notion of the architect as an organizer of building" [11]. Moisei Ginzburg, one of the founders of the OSA, was one of the first architects to bring to light the importance of the user's input whom to him, had a specific contribution to architecture, which was a collective act, a participatory result, a continuous process. Different from the starchitects from the Modern Movement, OSA placed the architect as an in-between actor, "synthesizing different positions without overwhelming them"[12]. In offering a different perspective of how architects would best contribute to social issues the group presented a concurrent response to the broadly spread conclusions of the CIAMs, anticipating in a way the participation movement that emerged later in the 1970s.

In 1960, Hungarian architect Yona Friedman (1923-2020), developed the first schemes for his project of Ville Spatialle, an elevated city that allowed for people to compose their own house design in a scheme that would add density to the existent fabric of the cities. Villa Spatialle represented a turning point for

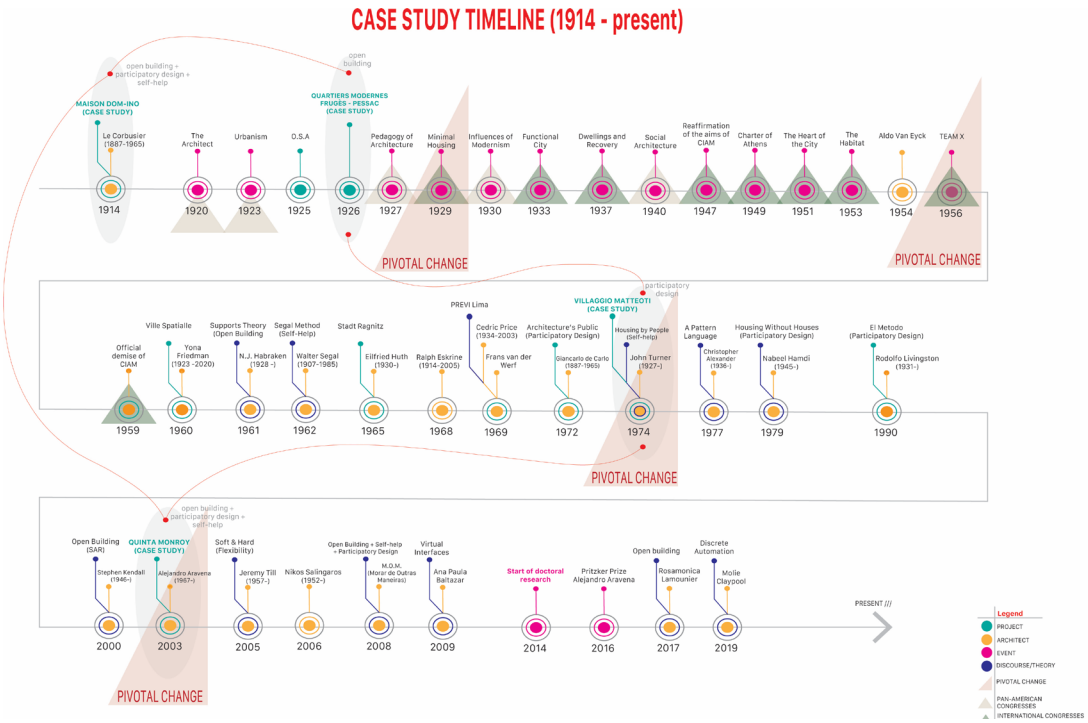


Figure 2. Case studies timeline. Diagram by the author.

housing due to its speculative frame idea, allied with the total freedoom of choice in matters of living.

The research and debates that derived from the consideration of the importance of the social role of the architect in the contemporaneity generated a new "movement," known as Public Interest Design. Also called Public Interest Architecture, it is rooted participation and works by having designers tackle communities' issues through a collaborative process, thus empowering the public and ensuring validity in interventions. Bryan Bell is one of the most recognized advocates of the movement, and stated that "architects' most significant contributions can be as the form-givers for others, shaping lives in the most fundamental and personal ways."[13]

ELEMENTS OF PARTICIPATION: AN OVERVIEW

For the scope of the research, three concepts were analyzed and defined as **elements of participation**: open building, self-help, and participatory design. This definition was established for them as a whole because when thinking about collaboration applied in social housing projects, these elements should always appear together.

The concept of **open building** derives from the Supports Theory, developed by Nicholas John Habraken and published in English in 1972. The author developed a scheme to reintroduce the user in the decision process not only of the social housing design but also in other aspects of its production; professional and political. Recognizing that the users can decide about how to manage their dwellings but determining a clear separation between the knowledge involved – technical and non-technical -, a legitimate space for collaboration surfaces[14] . Hence, the theory starts to form linking the collective to act as a support, and the individual to act as an infill[15]. Support represents the immutable part of an open building project, a "base building" that receives the infill, which will act as a completely independent part serving the needs of the users, assuming multiple possibilities. Schneider & Till[16], also noted that Habraken's system more than technical, it represented a tool for empowerment of the user in the design and appropriation of their home. Kendal & Teicher, pointed out that open building is a definition that emerged following social, political, and market changes that claimed a better solution involving both decision-making and building development[17].

Self-help can be comprehended as the process by which inhabitants, not necessarily with technical knowledge, built and transform their space of living using their resources and executing the decisions without abiding by any code, building, or urban planning [18]. By definition, an informal practice, self-help represents much more than that, since "a third of the world's people house themselves with their own hands, sometimes in the absence of government and professional intervention, sometimes despite it"[19]. This affirmation was corroborated by Aravena & Iacobelli who revealed that in Chile for instance, "self-help will happen despite design and not thanks to it."[20] Ward (1976), emphasized the fact that self-help crosses all income levels, not being a mere product of low-income classes due to the lack of government support in providing adequate housing and services[21]. This statement brings awareness for the power of people in constructing the environment where they live, literally

dwelling in the experience of their habitat. Thus, it is imperative to consider and use this power and how it leads to autonomy when creating a social housing project.

Participatory design can be traced back to Giancarlo De Carlo, initially within the Team X in 1956 and later in his 1969 manifesto, titled Architecture's Public [22]. De Carlo was an important figure who appeared as one of the strongest critics of the Modern Architecture from the perspective of how transformative architecture really were under the movement's doctrines[23]. With an understanding of architecture as a social process, he was the central figure in formulating the discourse of participation related to architecture.

In the United States, Henry Sanoff (2010), described the multiple ways participation can be viewed, starting with the citizen participation in community decision-making represented in Plato's Republic that grew out to become one of the strongest concepts in American society[24]. Nabeel Hamdi (1995), continued the exploration of the subject both in practice and in research. Schneider & Till (2007) highlighted that from the late 1960s, there was a growing number of projects being developed that encompassed the context of user empowerment and participation. Hamdi (1995), compared the thoughts of N.J. Habraken and John F. Turner in the matter by emphasizing that while Habraken considers participation as "an essential part of repairing the natural relationship between people and place"[25], Turner embraces a broader perspective, which places responsibility in governments, NGO's and the building industry to engage with the users.

The theory gained a refreshed look in practice that lead to updated literature with Alejandro Aravena, who in 2003 started developing projects in his office ELEMENTAL embedding the philosophy of participatory design in allowing users to contribute to their dwellings following an architectural rationale. Aravena's contribution embodied not only participation but also open building concepts, in what he called the "half-house"[26]. While the architect claimed not to have based his method from any of Habraken's theories, his contribution is relevant. It represents an innovation because he was able to identify through participation the main constructive elements necessary for the Chilean population.

METOD

The research developed a theoretical analysis towards a working framework to be used in practice and pedagogy by using a combination of two research strategies: logical argumentation and case studies. Logical argumentation connects, explains, and establishes the whole argument of the investigation since its primary purpose is to frame the reasoning in a system that has broad explanatory applicability[27]. Logical argumentation was chosen because this research aims to change the way architects and educators position themselves on social housing by developing a framework for thinking and designing social housing projects incorporating open building, self-help, and participatory design.

Case studies complemented the assessment of the theoretical concepts proposed as a structure for social housing design and pedagogy, establishing a calibration parameter for future projects. The case studies selection derived from a timeline highlighting relevant discourse, architects, and projects incorporating the theories from 1914 to 2023. The timeline, displayed in Figure 2, shows moments of pivotal change regarding social housing and elements of participation occurring approximately every 30 years. Two representative projects from architects that have globally impacted the housing discourse serve as case studies for investigation: **Maison Dom-Ino (1914**) by Le Corbusier, and **Quinta Monroy (2003)**, by Alejandro Aravena. The selection of these architects and their projects observed their influence on critical changes in social housing discourse and architectural education.

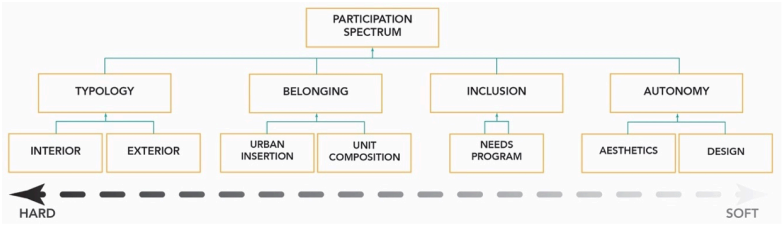
CASE STUDY SELECTION AND DATA ANALYSIS

The case studies' examination followed two structured phases. Phase one focused on constructing the "macro" picture of each project, creating a matrix of categories and distributing the evidence amongst them, investigating the following aspects: historical context, site context, and architectural theory. Phase two concentrated on composing the "micro" picture: developing a project analysis and evaluation of architectural drawings and other artifacts through a soft & hard scale system, generating data displays that measured each case study's performance under a participation spectrum. Thus, the two phases of the data analysis followed an explanation building technique, analyzing the data by explaining each case study and observing stances of pattern matching [28].

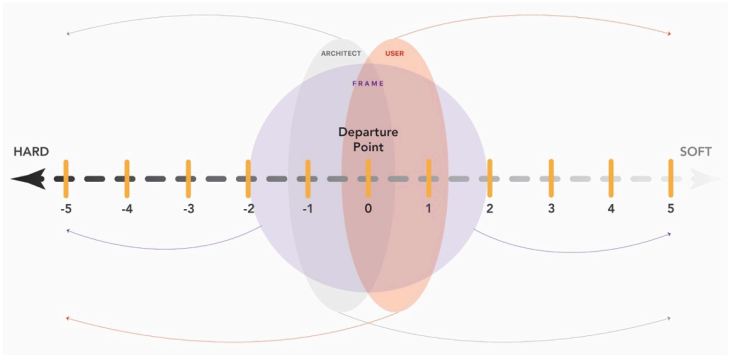
SOFT AND HARD SCORE

Soft and Hard is a parameter created by Schneider & Till in their book *Flexible Housing* (2007) for analyzing levels of flexibility. It is a theoretical classification in which soft refers to flexible solutions that allow space for indeterminacy. Hard applies when projects' flexibility is structured with elements linked more specifically to the way the design may be used [29]. In soft approaches, the user has more control over the complete design (plan, interior, exterior) with the architect acting in the background. For hard uses, the architect takes the lead in the process, regulating the use, size, and overall appearance of the project.

Schneider & Till (2007) only offered this classification abstractly in their book as a way of explaining degrees of flexibility. This paper expands this concept, by adding a numerical scale to transform theory to data for the case studies. This decision also came to materialize the conceptual aspects of the selected projects graphically within their diversity beyond the scope of architectural description in a manner to highlight their limitations and strengths. The scale ranged from minus five (-5) to five (5). The negative side did not stand for a negative result; it only denoted approaches where the architect's control over the whole design was higher. It is also important to realize that in this case, the zero value (0) did not mean balance, but instead, the representation of the departure point of the projects, from



PARTICIPATION SPECTRUM - CASE STUDY ANALYSIS				
CATEGORIES	COMPONENTS	SOFT & HARD	VARIABLES OF ANALYSIS	PERCENTAGE
typology	Interior	from -1 to 5	FLOOR PLAN/SECTION	from 0 to 50%
	Exterior	from -1 to 5	SECTION/FAÇADE	from 0 to 50%
belonging	Urban insertion	from -1 to 5	SITE PLAN /FLOOR PLAN	from 0 to 50%
	Unit composition	from -1 to 5	SITE PLAN /FLOOR PLAN	from 0 to 50%
inclusion	Needs program	from -1 to 5	FLOOR PLAN	from 0 to 50%
autonomy	Aesthetics	from -1 to 5	FLOOR PLAN/FAÇADE	from 0 to 50%
	Design	from -1 to 5	FLOOR PLAN/FAÇADE	from 0 to 50%



BALANCE	SCORE	HARD & SOFT SCALE
100% ARCHITECT	-5	Full control; Architect has total power of decision **(HARD)**
90% ARCHITECT 10% USER	-4	
85% ARCHITECT 15% USER	-3	
80% ARCHITECT 20% USER	-2	
75% ARCHITECT 25% USER	-1	
70% ARCHITECT 30% USER	1	
60% ARCHITECT 35% USER	2	
65% ARCHITECT 40% USER	3	
55% ARCHITECT 45% USER	4	
50% ARCHITECT 50% USER	5	Shared process of decision or highest level of flexibility **(SOFT)**

Figure 3. Participation Spectrum and Soft and Hard Score rubric for case study analysis. Image by the author.

where they started. to which score they reached within their final solutions.

Soft and hard point scale rubric

The rubric displayed in Figure 3, represents the percentages considered for the Soft and Hard scale, aligning them from the total level of control by the architect (HARD) to the shared decision-making process (SOFT), or the 50/50 approach. It is essential to clarify why the scale starts from 50% within the understanding of the shared process between architect and user and not 0%; for the scope of the study, 100% user control represents the total exclusion of the architect from the production of social housing, as we can see in favelas . The study acknowledges the favela as the embodiment of people's lack of access to basic needs and their right to the city [30], and their undeniable capacity for self-organization[31]. However, it also aims to show that the architect is an essential figure in society who must act not only as an enabler and as a disseminator of architectural culture.

The combination of the participation spectrum, variables of analysis, and Soft & Hard scale resulted in the case study analysis Table, which demonstrate the performance of each case study regarding participation. The table is complemented by formal analysis diagrams and a radar chart, which has the quality to show variables distribution. This analysis demonstrates how the case studies data transpose to the participation spectrum table. In each of the projects, the percentage of space allocated for the contribution of the architect and the user was obtained through ratio calculation of the variables of analysis (site plan, floor plan, and façade). The formal analysis diagrams show highlighted in red, areas where the user shares decision control with the architect, along with the percentage that this area represents. Applying the values to the participation spectrum table following the rubrics, as mentioned earlier, generates the radar chart demonstrating how the case study performs in each category and the overall spectrum.

CASE STUDIES PERFORMANCE ASSESSMENT

Maison Dom-Ino (1914)

Possibly one of the most thought-provoking schemes in the history of Modern architecture, the drawings of Maison Dom-Ino developed by Le Corbusier represented not only a scheme that would influence perhaps forever the principles of housing construction, but also the first emergency housing purposefully

conceived as such[32]. Maison Dom-Ino is therefore a canonical project for social housing due to its essential yet poetical idea.

It is a fact that the idea of mass-production envisioned by Corbusier in his Towards a New Architecture manifesto of 1986 has been wholly corrupted and transformed into a perverse way of producing social housing, especially in Latin America. However, when reading his reflections about the timeless housing problem and the promise of mass production, I see the clear intention of making this system democratic to the users. Moreover, I envision the search for a new definition of user aesthetics, particular to his/her understanding of the housing typology. Designed in 1914 by Le Corbusier serving as a response to the devastation and housing deficit resulted from the World War, it was a prototype of prefabricated structure for mass production while encompassing the central premises of the Modern Movement. The Maison Dom-Ino mas conceived using the frame as its main feature: an independent component that carried floors and staircases[33].

The initial scheme allows multiple combinations, making it possible to adapt to different site conditions. Its "beam-column" construction system (*Sistema viga-pilar*) still resonates today in Latin American construction, especially on informal settlements. Analyzing the architectural theory of Maison Dom-Ino is two transit between its dual condition of both diagram and architectural scheme. In my understanding, for Le Corbusier, the idea of Dom-Ino was always an architectural proposition rather than just a formal speculation. However, the critics tend to evaluate the project either for its architectural representation or its meaning for the discipline.

It is important to analyze the Dom-Ino scheme from three distinct points of view: past, present, and future. When first conceived in 1914, it was entirely based to be a system of parts subordinated to its frame, an open building system: "the seminal image in defining the distinction of support and infill"[34]. Furthermore, it had an inherent anarchist proposition for housing, being able to also incorporate self-help construction. Corbusier's description of the Dom-Ino system does not show a dictatorial master with a desire to standardize, but rather, a theorist in search of an effective meaning for housing. Hence, observing the way in which Corbusier incorporated mass production for Dom-Ino within an automated interpretation, establishes a part-to-whole relationship subordinated to the frame.

The participation spectrum results for Maison Dom-Ino, displayed in Figure 4, reflect both the theoretical and quantitative conditions to which the scheme was conceived. Since it was only developed at the speculative level, its scores also rely on Corbusier's vision for what Dom-Ino could become. Hence, due to the nature of the plan, imagined as an open building structured, allows for over 50% of its area for user's transformation on both interior and exterior, amounting to a score of five (5) on both units of analysis.Regarding the project's belonging category, urban insertion received a score of minus five (-5), considering the fact Corbusier already considered in his schemes how and where the units would be inserted in a hypothetical site. In contrast, unit composition is ranked at one (1), because the structural system of Dom-Ino was envisioned in a way that the residents could continue to combine their modules, following the structural clues provided by the frame of the design.

The categories of inclusion and autonomy and their respective variables of needs program, aesthetics, and design all scored five (5), following the trend established by the typology category. The users would be able to establish their own needs program organizing the free plan offered by the scheme, and display their understanding of aesthetics and design thought the customization of the exterior of their houses.

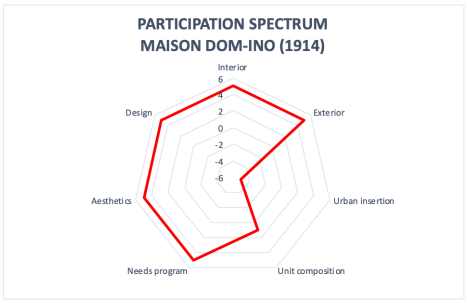
These values place Dom-Ino as **soft** scheme for social housing, , with a participation spectrum mean of three (3). This conclusion is evident when looking at the radar chart of the project, which shows more than half of the units of analysis scoring on the positive side of the soft & hard point scale.

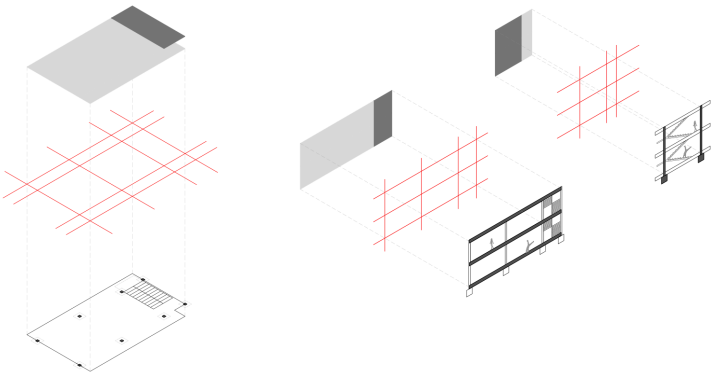
Quinta Monroy (2003)

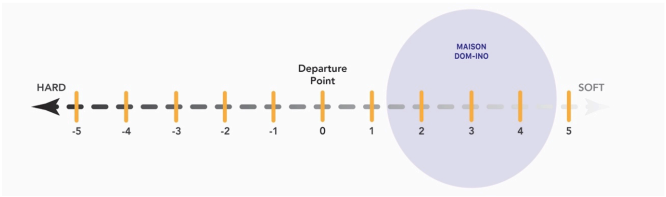
This is Elemental's first built social housing project. Located in Iquique, Chile, Quinta Monroy incorporated the users' input established a framework that allowed users to build half of their house . This project started a trend of proposals that would end up qualifying the Alejandro Aravena as one of the most prominent figures in social housing design in Latin America and around the world in the contemporaneity, conferring him the 2016 Architecture Pritzker Prize. In 2002, the Chile Barrio Program commissioned the office Elemental ,with a social housing project undertaking an informal settlement called Quinta Monroy, at the core of the city of Iquique, in Chile. The country stands out in Latin America as the only country that advances social housing policy towards inclusivity and exploration . The project for Quinta Monroy ended up being part of a new housing policy that the MINVU was about to launch: the Vivienda Social Dinámica sin Deuda - VSDsD (Dynamic Debt-Free Social Housing).

Even before starting the project of Quinta Monroy, Aravena, Iacobelli and Allard were invited to teach at Harvard GSD. From 2001 to 2003 they taught architecture studios investigating social housing proposals, and these experiences rendered one conclusion: a social housing design should be able to expand. The team then created what they called "Parallel Building"[35]. Here I make my biggest critique of Aravena's design philosophy for social housing; the unquoted theories that neither him nor the rest of the Elemental team acknowledge applying to their design. It is interesting to observe that by understanding the need for expansion and porosity, he was already designing an open building system with the concept of the Parallel Building. However, Habraken's (1972) theories on support structures do not appear as a reference. To grasp the concept of incrementality

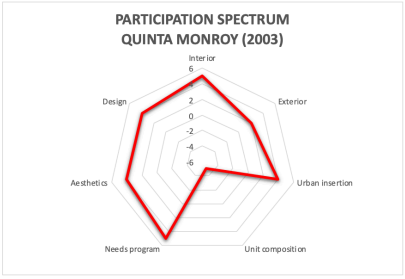
MAISON DOM-INO (1914)		
PARTICIPATION SPECTRUM	SCORE	CATEGORIES
Interior	5	typology
Exterior	5	
Urban insertion	-5	belonging
Unit composition	1	
Needs program	5	inclusion
Aesthetics	5	autonomy
Design	5	
PARTICIPATION MEAN	3	

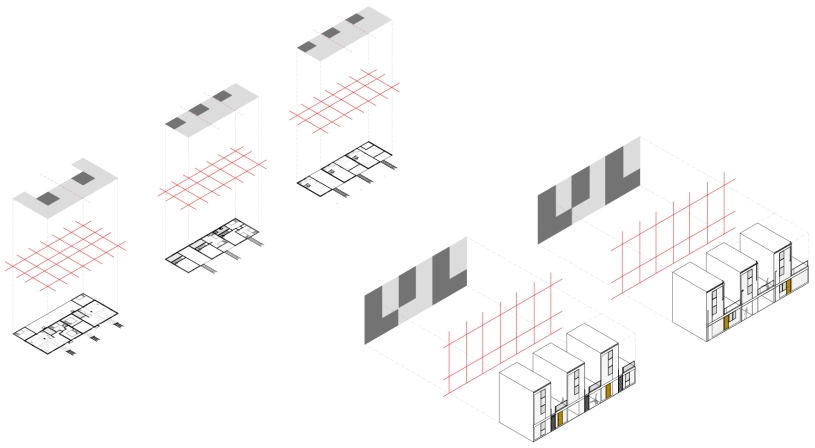






QUINTA MONROY (2003)		
PARTICIPATION SPECTRUM	SCORE	CATEGORIES
Interior	5	typology
Exterior	2	
Urban insertion	4	belonging
Unit composition	-5	
Needs program	5	inclusion
Aesthetics	4	autonomy
Design	4	
PARTICIPATION MEAN	2.714286	





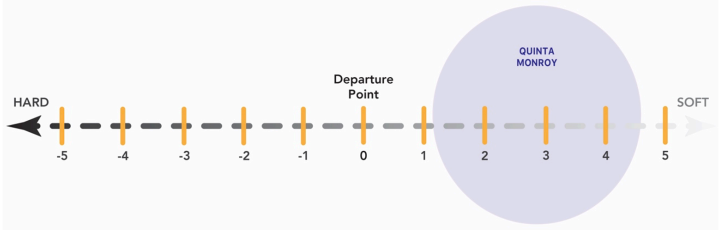


Figure 4. Perfomance analysis for Maison Dom-Ino (1914) and Quinta Monroy (2003), displaying formal analysis diagrams and radar charts. Image by the author.

the office analyzed case studies of social housing projects in Latin America, but never mentioned canonical the works by Turner (1972) or Ward (1976), who had profound influence worldwide. Finally, while he acknowledged the use of participatory design, he did so without referring the contributions of Giancarlo de Carlo (1980) or Nabeel Hamdi (1995).

Faced with a limited budget of US$ 7,500 per family while maintaining the original site of Quinta Monroy, the premise of the project was to innovate by combining typologies that could be expanded by the residents. Hence, instead of designing a small house of 30 sqm, they provided a middle-income home, with the first cell representing the beginning of that investment, which would be finished at 72 sqm[36]. Using the Parallel Building as their initial design framework, through a participatory process, the architects identified the basic needs for the group of families, which consisted of five conditions:

1. Structural skeleton of the house (frame)
2. Kitchen
3. Bathrooms
4. Stairs
5. Partition walls

These elements, which the residents would not have the technical knowledge to execute safely and accordingly to code would also help them achieve a "middle-class DNA".

The participation spectrum results for Quinta Monroy , displayed in Figure 4, reflect the theoretical propositions of Elemental, and the post occupation data provided by the residents presented by Aravena & Iacobelli in their book, *Elemental*. Due to the nature of the projects' philosophy of "half-house", the plan, imagined as an open building structured, allows for over fifty percent (50%) of its area for user's transformation on its interior amounting to a score of five (5). For the exterior, thirty-five percent (35%) of the typology's façade allow customization, placing this unit of analysis at two (2) in the soft & hard scale.

Regarding the project's belonging category, urban insertion received a score of four (4), considering that residents already occupied the site before the Chile Barrio Program. The fact that the residents were able to maintain their place of choice for living is a great accomplishment, subverting the pattern of public programs in Latin America, especially those dealing with relocation of informal settlements.

On the other hand, unit composition scored at minus five (-5) because although the architects employed participatory design to understand the residents' needs, the typological result of this process was presented to the residents as a final result. There is also a very clear limit for the expansion of the housing units embedded in the project's organization, making impossible any change pertaining the position of the housing units in the site.

The inclusion category ranked five (5), demonstrating the complete power of decision of the residents regarding their needs for the houses. The participatory design strategy applied by the architects achieved such an in-depth level of user understanding that it uncovered a "middle class DNA" as a denomination of their needs.

Finally, the autonomy category and its respective variables of aesthetics and design scored four (4). Although the percentage allowed for exterior modification from the ratio calculation was thirty-five percent (35%), ranking the exterior unit of analysis a two (2), when considering design and aesthetics, we look to the house as a whole, not as a half. Since Elemental delivered their "half" of the house as bone structure concerning all the categories analyzed in this study, the overall aspect of the design after customization could be significantly different from the architect's understanding, as shown in the image below. This possibility of generating new design and aesthetics from the inhabitants' perspectives, reinforces the softness of the parti, justifying the higher score for these units of analysis.

These values place Quinta Monroy as soft scheme for social housing, with a participation spectrum mean of **two point seventy-one (2.71)**. When looking at the radar chart of the project, six of the seven categories of the spectrum scored on the positive side of the soft & hard point scale.

INITIAL CONCLUSIONS

During the second phase of the case study analysis, one particular element stood out on all four housing designs: **the frame** . Perhaps the most important component present across the four projects analyzed in this paper, it is an element that has dual embodiment; it can be literal or implied, material or theoretical, open or closed. Its versatility and familiarity qualifies this element as the core component of the framework that will encompass the elements of participation. Thus, the frame is the element that will serve as a vessel to incorporate open building, self-help and participatory design. It is a mediator that will adjust based on the soft & hard score, encompassing the spectrum of autonomy and spatially organizes both the architect and the user's contribution; through it, participation can happen, implicitly and explicitly.

A canonical element in architecture, the frame embodies even more significance in the context of housing. Marc-Antoine Laugier described an idea of frame applied to housing in his Essai sur l'architecture of 1753, when referred to a man in his primitive state in search of a shelter. A representation of this primitive hut was illustrated by Charles Dominique-Joseph Eisen (1720–1778) in the frontispice of the second edition of Laugier's essay.

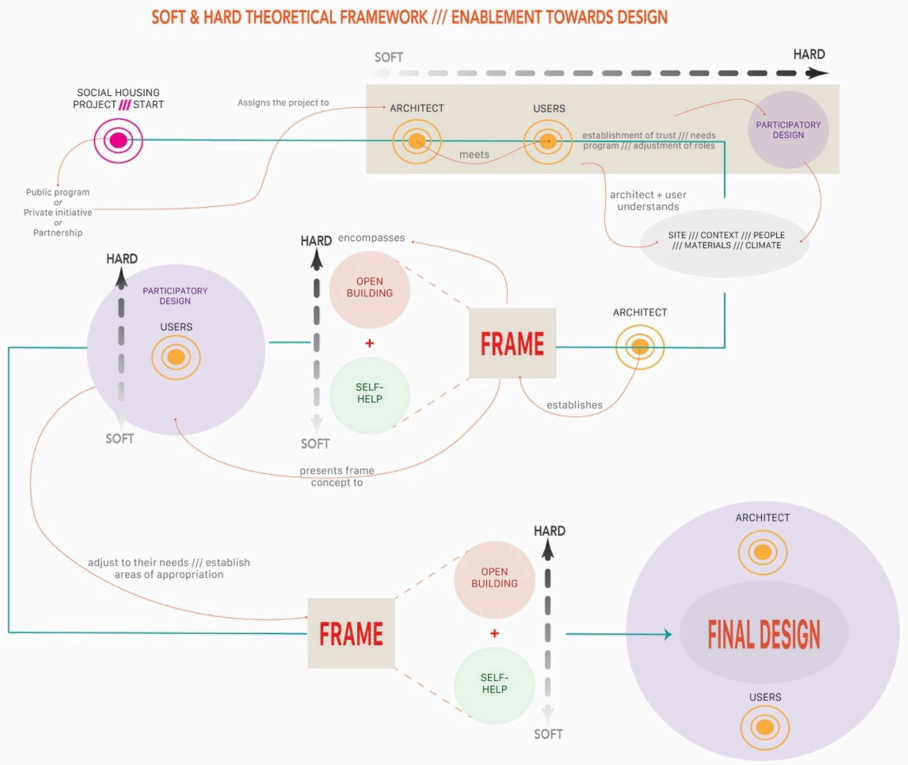


Figure 5. Soft and Hard Framework for the design of future housing projects. Diagram by the author.

> *The man is willing to make himself an abode which covers but not buries him.* Some branches broken down in the forest are the proper materials for his design. *He chooses four of the strongest, which he raises perpendicularly and which he disposes into a square.* Above he puts four others across, and upon there he raises some that incline from both sides. This kind of roof is covered with leaves put together, so that neither the sun nor the rain can penetrate therein; and now *the man is lodged.*
>
> —Marc-Antoine Laugier, *Essai sur l'architecture*[37]

The same way, Colin Rowe (1966), emphasized its importance for the discipline of architecture, as a catalyst element with the capacity of transcend its structural function and become an embodiment of architectural character:

> Apparently, the neutral grid of space which is enclosed by the skeleton structure supplies us with some particularly cogent and convincing symbol, and for this reason the frame has established relationships, defined a discipline, and generated form. *The frame has been the catalyst of an architecture; but one might notice that the frame has also become architecture, that contemporary architecture is almost inconceivable in its absence.* (...) it might be fair to say that the frame has come to possess a value for contemporary architecture equivalent to that of the column for classical antiquity and the Renaissance. Like the column, the frame establishes throughout the building a common ration to which all the parts are related; and, like the vaulting bay in the Gothic cathedral, *it prescribes a system to which all parts are subordinate.*
>
> —Colin Rowe, *The Mathematics of the Ideal Villa* [38]

Understanding the frame as an essential part of social housing design leads to the realization that it is time to rethink the concept of good and bad when classifying social housing projects. These denominations presuppose that there is a definitive design answer to the issue, and as I demonstrated and discussed throughout this study, this position it is simply not sustainable. That is why the frame becomes such a crucial element in social housing. At the same time that defines participation from the bottom-up in a clear and organized manner, offers infinite spatial possibilities. This became clear when analyzing the case studies. Just because a project falls under the hard side of the score, it does not mean that is wrong, the same way that softer solutions are not automatically right. The application of the frame informed by the soft and hard scale serves precisely to mediate the necessary level of softess or hardness required by each context and inhabitant, preserving the diversity necessary for a complex subject like this.

The case studies' analysis also demonstrated that depending on the context, there is a tuning of the contribution of users, architects, and the frame in how much appropriation will the

design afford. This proves that what makes social housing design most effective is the adaptation of the solution to the context, embodying levels of collaboration that are comfortable to the inhabitants. That's why the Soft & Hard Score is so important. It confers the flexibility needed to achieve the balance of each input, and thus arrive at a project that truly represents the characteristics of the inhabitants while still advancing architecture.

Hence, *The Soft and Hard Framework*, displayed in Figure 5, aims to facilitate the collaboration during all the phases of the social housing design, and ultimately promote more equality while articulating the concepts presented in this study:

- The elements of participation: open building, self-help, and participatory design.

- The three forces that act in social housing design: architects, users, and the frame.

The diagram details the process by which all of these elements can be combined during all phases of a social housing design. It defines a dialogue amongst architects and users mediated by participatory design at the beginning of the process, in order to establish trust and understand their individual and collective needs. After that, the architects present an initial design encompassing frame, open building, and self-help strategies that will be refined by the users, once more through participation. This adjusted frame will then be refined once more by architects and users, until, reach the final project stage; a collaboration between forces that materializes a shared vision of social housing design, pertinent to its context and its people.

Therefore, the analysis prompt us to think not only about the redefinition of the architect's role, but also of the users and of the frame. Architects must act as enablers, users as collaborators, and the frame as a mediator/interface of them, composing three forces acting within the social housing design. These three forces will navigate the Soft and Hard Score and adapt according to specific project and cultural needs that will be identified at the beginning of the design process and collaboration. Finally, **it is interesting to observe the elasticity of the three forces on all of the case studies without interpreting the designs as better or worse, right or wrong, but rather, observing how they incorporated the context and housing problem, and how residents reacted to it.**

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