Mechanization Takes Command, Again

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Abstract: Mechanization Takes Command is the title of a book written by Sigfrid Giedion in 1948, which can be considered the first essay on the history of technology, where great importance is given to the furniture too. It covers almost a millennium of inventions. Mechanical furniture helps us to save space, they can transform the rooms where we are living or working. Mechanization is a concept not only referred to an object. What I would like to analyse in this paper is the comparison of three levels of mechanization in housing projects, each able to modify and transform spaces, acting on the single room, on the internal volume and also on the façade.

Key words: Mechanical furniture, flexibility, living spaces.

1. Introduction

Mechanization Takes Command is the title of a book written by Sigfrid Giedion in 1948. Architectural historian, Sigfrid Giedion graduated in engineering at the Technische Hochschule in Vienna in 1913 and continued his studies first in Zurich and then in Munich. He dealt mainly with contemporary architecture and reconstructed the events of the Modern Movement from the inside, proposing them as the result of new moral demands and the renewed possibilities offered by engineers to architects. In 1928 he founded the Congresses of Modern Architecture (CIAM) with Le Corbusier and others. Called to Harvard in 1937 at the Faculty of Architecture directed by Walter Gropius, Giedion wrote his best-known text, Space, Time and Architecture: The Growth of a New Tradition in 1941, which I had the chance to read during my architectural studies, a story of the Modern Movement from the pioneers (Eiffel, Sullivan) to the works of its protagonists (Gropius, Wright, Le Corbusier, Aalto), which Giedion, in addition to knowing personally, relates to contemporary artistic avant-garde movements such as Futurism or Cubism [1].

Giedion traced the development of mechanization in Western history, from ancient and medieval times to the mid-20th century, with special attention on the 19th and 20th century. From 1850 Americans made extensive use of technical tools in domestic chores. The anonymous inventors soon began to deal with the mechanization of furniture and their work proved to be particularly brilliant in the design of chairs for special uses. In close collaboration with industry, hairdresser’s and barber’s chairs, dentist’s chair, or railway furniture for sleeping carriages and restaurants were made. Similar attention was given to office furniture to make the best use of available space and wheelchairs for the disabled (Figs. 2-4).

The author, also, traced the mechanization of some rooms in the house: kitchen, bath, laundry.
In the end of the book, Giedion pointed out the question of what mechanization could mean for man. He argued “mechanization is an agent, like water, fire, light. It is blind and without direction of its own. It must be canalized. Like the power of nature, mechanization depends on man’s capacity to make use of it and to protect himself against its inherent perils… To control mechanization demands an unprecedented superiority over the instruments of production. It requires that everything be subordinated to human needs.”

2. Moving Furniture

More and more often nowadays architectural interiors exploit the mechanization of dividing and
furnishing elements to make a space flexible, even more so when it is small and must adapt to perform more functions throughout the day. Moving walls, shifting configurations, hidden compartments, retractable furniture, multifunctional built-ins, sliding furniture, are some of mechanical elements used to suit owners’ needs.

Italian design offered some example of multifunctional furniture to transform the house during the day. Total furnishing, designed by Joe Colombo in 1972 for the exhibition The New Domestic Landscape in New York, is monoblock elements, a system of independent equipment from the housing container capable of ensuring high flexibility of performance able to offer thus a dynamic space, in continuous transformation, according to the requirements (Fig. 5). It is organized in four blocks: kitchen, cupboard, bathroom, bed and privacy: the cabinet acts as barrier between the kitchen and the environment bed and privacy, which summarizes in itself all the functions of living, sleeping, eating, reading. The sleeping area is achieved with two pull-out beds, as well as the table located under the TV unit is removable [3].

The world leader in the field of mechanical furniture is Clei, founded in 1962, in a period when there was an important debate on the flexible furnishing theme [4]. Furniture was and is designed to create solutions capable of multiplying and transforming the domestic space in both the living and sleeping areas by acting on the bed, wardrobe, sofa, table, bookcase, kitchen and TV unit as showed in the schemes below (Fig. 6).

Fig. 5 Total furnishing kitchen and bed & privacy.

Fig. 6 Furniture movement (sliding, pivoting, overturning) creates different situations: (a) working, (b) cooking and eating, (c) relaxing, (d) sleeping.
Source: www.clei.com.

In large cities where people often live in studios or mini-apartments, the solution of furnishing houses
with multifunctional and transformable furniture, which appear and disappear as if they were objects, is increasingly common. The quality of the opening, sliding and rotation mechanisms, which are stressed daily to generate the various configurations of the domestic environment, therefore becomes important.

3. Transforming a Plan

I have been teaching interior architecture for many years at Politecnico di Torino and every year I like to introduce students to the video Domestic Transformer: Tiny Apartment Transforms by Gary Chang, He graduated from the Department of Architecture at the University of Hong Kong in 1987 and founded EDGE Design Institute in 1994 [5].

He transformed his 32-square-metre house into all-in-one apartment in downtown Hong Kong. It is a wonderful example of tiny apartment transformed into different spaces for different needs along all the day. Living in a small apartment does not mean living badly and Gary Chang demonstrated this concept. He studied different distribution possibilities to optimize the space: it can be transformed into 24 different scenarios through the use of sliding walls and panels, where some pieces are unfolded, while others are folded/fitted back: the equipped kitchen wall disappears when not used, the sofa turns into a bed, the table flips over from the wall (Fig. 7). The space is configured according to the different moments of the day.

Chang became a global phenomenon when he was interviewed by The New York Times back in 2009 about his incredible invention. He was able to transform a flat where he moved into with his parents and three sisters when he was 14 years old, so a house where six people lived together. This small space consisted of 3 miniature bedrooms, a kitchen, a bathroom and a corridor used as living room: the space was very tight, all in a 17 story building with 370 units. In 1988 he bought the house, decided to knock down the walls and completely redesign it for his new needs.

Gary Chang said small area means efficiency and user-friendliness, “the house transforms and I always here, I don’t move. The house moves for me”. Indeed he was able to transform his apartment according to a young architect’s needs.

Sliding wall panels are suspended on metal rails bolted to the ceiling, in this way they seem floating above the reflective black granite floor. The mirror ceiling creates the optical illusion of more space and at the same time works to increase the light inside the apartment. As the panels are shifted around, the apartment becomes all manner of spaces: kitchen, library, laundry room, dressing room, living room, bedroom, dining room and a bar. Just a simple wall hosting the bookcase can be moved to reveal a closet which in turn can be moved to reveal a bathtub; if not in use, it can be covered with a tilting bed for guests. Once you pull it shut, one space becomes public and the other private (Fig. 8). The kitchen is behind the TV: the kitchen is pretty compact; two metres wide, but fully equipped: a sink, a four-burner hob and a worktop. The dining table becomes a work table and vice versa, every day a small two-seater sofa disappears to make room for a large double bed (Fig. 9).

When all the furniture is pushed against the walls, the flat seems large, perfect to host a large screen,
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4. Transforming a Volume in the Inside

In the previous case study, common in many other situations in crowded cities where the space is very tight, it is clear how an interior can be transformed from a planimetric point of view, using mechanical furniture and moving elements, both sliding and pivoting.

The house Lemoine designed by Rem Koolhaas in Floriac, in the neighborhood of Bordeaux, in partnership with Ove Arup is moving too, and is dynamic inside its volume, from one level to the other [6]. This building has been defined by Time magazine as the Best Design of 1998. The house was the result of the needs of a couple, whose old house had become a prison for the man, forced into a wheelchair due to a car accident. The house is organized around four patios and has three storeys.

I do not want to describe this masterpiece of villa, but I want to put attention on its transformation according to the owner’s needs. One of the patios is a mobile room in height: it is a 3 by 3.5 metres hole with glass ceiling where a hydraulic elevator is running from one level to the other. Pushing a button, the platform moves from the ground-level kitchen and courtyard to the glassed-in middle floor hosting the living room with access to the garden, to the top level containing the bedrooms. This platform is arranged as an office, with desk and chair (Figs. 11 and 12).

descending from the ceiling just behind the window, from which to watch a movie while relaxing in a hammock (Fig. 10).

It should be noted that the flat is equipped with a shower which is also a steam room with colour therapy and massage while the toilet has a heated seat and remote control bidet.

In the Domestic Transformer flat each room can disappear and be compacted when it is no longer used, so as to leave more space for the rooms according to the needs of the moment.
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The mobile platform is the mechanical heart that flows in height inside a volume: in this way, the owner can carry out his functions by changing the layout of the rooms where he stops the platform; the rooms can change their configuration, so they become dynamic. The platform has no balustrade around it and is equipped with a three-storey wall organized as wine cellar, as a bookcase, as shelving accessible at every level as the elevator stops [7].

5. Transforming a Volume and Its Outside

We can go further and talk about rooms that are transformed by acting on the volume of the interior space and at the same time on the facade of the building. This is the case of Sharifi-ha House, built in Tehran in 2013 by Alireza Taghaboni, founder of Next Office, one of the best known Iranian architects abroad (Fig. 13) [8].

The house is distributed over seven floors: the two basement floors are allocated to family conviviality, fitness facilities and wellness areas, while the ground floor hosts parking and service rooms. Public activities all happen on the first and second floor and the family private life takes place at the third and fourth floor [9].

I had the chance to meet architect Taghaboni in his office in Tehran where he explained me the concept behind the house designing.

A system of rotating boxes, the breakfast room on the first floor, the guest room on the second floor and the workroom on the third floor, twist and rotate by 90° thanks to a mechanical system composed by motorized

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Fig. 11  Lemoine house: the elevator between middle and upper level.  
Source: www.oma.eu.

Fig. 12  Lemoine house: the elevator at the bedroom level under the glass ceiling.  
Source: www.oma.eu.

Fig. 13  Sharifi-ha House: the main façade (courtesy of Next Office).
discs inserted in the floors, a portion of the internal flooring with a semicircular section which is lowered and 90° openable balustrades (Fig. 14).

The volumes thus become rooms open or closed to the outside according to the seasons, recalling a characteristic of the traditional Iranian house that changed its use according to the different periods of the year. The rotation of the volumes determines the change, not only in the design of interiors but also of the façade, regulating the level of thermal and lighting comfort and also the privacy, so dear to the Iranian people. At the same time the rotation makes the terrace and loggias larger. The box structure is a steel frame completed with an external finish of wooden planks. The short sides of the box are transparent walls; one of them allows the access to the loggia. The box has two doors located on each of the adjacent and perpendicular wall in order to provide the access to the terrace and to the house both in the close and the open position.

6. Conclusions

The three case studies analyzed and described above adapt to the functional needs of its residents, acting on the interior space, transforming the plan, the volume and also the façade.

These systems are very sophisticated, able to adapt to the specific requirements of the client, the result of the skill of the architect or designer and the technical-mechanical perfection of the components.

We can therefore say that mechanization takes command again, but it is accompanied by a correct awareness of who produces it and who uses it, as Sigfrid Giedion would have expected. Technical requirements and process efficiency are addressed to help human needs and behaviours.

I can say that the examples described above are the right compromise between STEMM disciplines and HASS ones: a close cooperation between them can solve big problems in daily situations and not only.

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