

Next Steps for Open Building Implementation

Principles

These notes are intended to offer some general insights and recommendations, based on what I have learned by visiting realized projects in a number of countries, regarding the possibility that open building principles could be usefully applied.

The idea of open building is simple: reestablishing a role for the individual in the housing process. This goes against much of our professional training. Experts are trained to believe that, with enough hard work, they can answer all the questions. But attempts to eliminate the individual from a role in the process of housing a society eventually produce problems. These problems include “illegal” activities (individuals changing their apartments inside and outside against the rules) producing disrespect for government; premature obsolescence of expensive social or private assets; and the inability to positively harness the natural inclination of individuals (independent of social class or income) to invest in their places of living as they see fit.

The fundamental insight of open building is that the community has a role to play in the housing process, but also that the individual has a role to play. Finding a balance of roles and interests is the key point. This means that implementation of open building is not essentially a technical problem. It is a problem of attitudes, habits, regulations that do not keep up with changing possibilities, and a misplaced reliance on unified control of a process that is too complex, too big and too spread out over time for any single entity to control.

Housing standards have changed

Housing standards have evolved over the past 50 years – space standards per person and per family have increased significantly. Compared to 30 years ago, housing today is more technically complex, projects are bigger, buildings have more utility systems, energy performance standards have increased and so on. For decades, in some rapidly developing countries, and under severe pressure to build more housing units quickly, standardized solutions have been developed with great effort and implemented widely. Quantity was the issue. But since space and equipment standards changed as the societies ability to provide better living conditions improved, the result is that tens of millions of units of housing have become obsolete far too quickly. And, the role of the individual in the process has been eliminated in favor of mass-production of standardized houses.

It may be the case that a shift is taking place from “Quantity” to “Quality.” With this shift, and with a frequent emphasis on shifting to a consumption basis, it may be possible to reintroduce the individual into the housing process with beneficial results. Open building methods may be able to assist in this transition.

Obsolete Standards and Regulations

Rethinking standards and regulations is one key to making the shift from “quantity” to “quality” in housing. For example, building regulations in many countries require that, in multi-story residential buildings, a bathroom in an apartment must be immediately above the bathroom in the apartment below. These regulations do not seem to require vertical alignment of kitchens or washing machines.

The question is why this vertical bathroom alignment is required. Answers may include:

1. Standardized apartment floor plans are easier to design, specify and to build. Apartments of a given size and layout are “stacked” one above the other. This simplifies an already complex process.

2. The practice of burying drainage piping in concrete slabs and beams has been rejected for some time, because lack of coordination during construction can lead to difficulties, and leaking pipes can degrade the structure. Making bathroom drainage piping (for toilets, showers and tubs) accessible in the ceiling of the unit below has become standard practice.
3. Drainage piping can leak if it is of poor quality or is poorly installed. It appears that it is important that if leaking should occur, it should not happen in the living spaces of units below, but leaking of bathroom drainage lines serving one apartment can be tolerated in another apartments' bathroom. In part this is justified because the ceilings of these spaces can be lower than in living spaces, offering space above a finished ceiling to conceal such pipes.

Open Building principles offer solutions that can give regulatory authorities an opportunity to change these regulations. These include the following:

1. Architects and consulting engineers can learn to design buildings with capacity for variation of layout in apartments above each other (most particularly the position of bathrooms) and change of size and layout at no extra cost in the design fee.
2. Given well-positioned vertical pipe shafts, variable locations of bathrooms + variations in space sizes and equipment are possible by routing horizontal drainage lines above the floor slab rather in the ceiling of the unit below, by use of rear-outlet toilets (floor mounted or wall - hung) and waterless waste valves (Wavin - HEPvO) or low-profile water traps for showers and bathtub. This can be accompanied by use of low-cost concrete slab waterproofing for use in the entire apartment space.
3. Introduction of smarter floor and pipe-routing systems (e.g. the upside-down steel beam+ concrete slab floor system used in Finland and the Netherlands, or the upside-down cast-in-place concrete floor structure that has evolved in Japan and in the S/I housing projects, or use of the Matrix Tile System developed by Infill Systems BV)

Divided Process: A permanent part (representing common interests) and a changeable part (representing individual interests)

Experts around the world have been trained to see housing as a complex process that is ultimately best controlled as a whole or unity. But this is no longer viable, or necessary. Project size, fast moving decision-making, and the inevitability of change of standards over time are forcing us to find better ways of working.

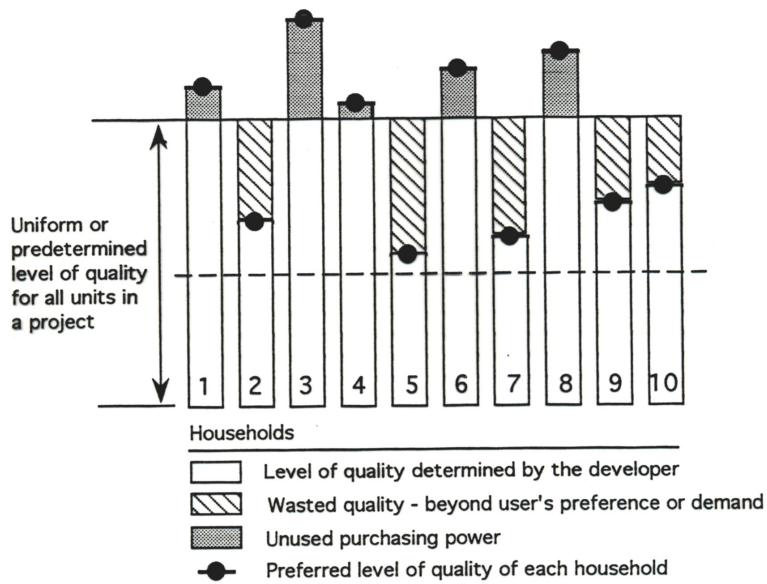
Dividing the housing process into two parts is coming to make sense for reasons of efficiency, management of scarce resources and social wellbeing.

This is the basic method of open building.

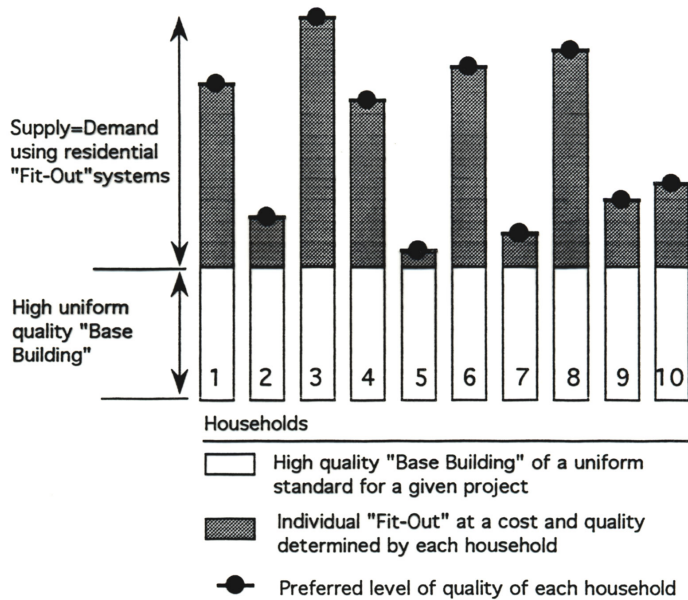
We can learn to build high quality "BASE BUILDINGS" with long asset lives suited to community values and priorities (energy conserving, safe, and capable of accommodating various and changing user requirements). These buildings will be easier and faster to build, and will have a longer useful live.

We then can learn to stimulate an INFILL INDUSTRY, capable of fitting-out the empty spaces in such Base Buildings with consumer-oriented INFILL (meeting appropriate standards). Because the INFILL is not integrated into the building, it can adjust and change safely and sensibly over time as requirements change.

The following two diagrams show the contrast between the now obsolete mismatch between supply and demand, and the open building way of matching supply and demand. (courtesy Karel Dekker)



A Conventional Project:
Mismatch Between Supply and Demand



An Open Building Project:
Matching Supply and Demand Exactly

What is in the BASE BUILDING, and what is in the INFILL?

For the BASE BUILDING, more is better, but more with the principle of capacity for variety and change. A good base building is not a neutral, empty building, but is an architectural infrastructure ready to accommodate variable and changing inhabitation. A good base building is helpful but not overly limiting. This means that a good base building is not rigidly designed for current standards and currently understood demands. Experts in open building have design, engineering and cost analysis methods for doing this work.

To reduce the amount of work and expense needed to fit-out the base building for variable and changing inhabitation, some structural walls may be built, but with good spacing between them. Also, carefully located vertical piping / mechanical shafts should be installed as part of the base building, to allow for variable placement and sizes of kitchens and bathrooms, considering good space planning, and access for living and general purpose spaces to natural light and ventilation.

Once the building is divided into apartments, the INFILL for each apartment will include non-loadbearing interior walls (including walls lining the base building walls for running wiring and applying finishes); doors; cabinets; plumbing fixtures; and all of the pipes, wires, ducts and other utility systems associated directly with the current floor plan.

Needed Research and Development to move forward

From my understanding of developments in various countries over the past 20 years in the housing sector, the most important step toward implementation of open building is research into dividing the housing process into two steps, as indicated above.

There are parallels. The office and retail sectors already operate in an open building mode. One company invests in and builds an essentially “open” building ready for variable and changing occupation. This is followed over time by other companies investing in and fitting out spaces made available in the building for individualized occupancy. Often the company building the building will be different from the company fitting out the spaces inside.

Building permitting, building regulation and building finance have come into alignment with this investment scenario. Even building products, systems and logistics have changed to support this kind of dynamic process.

Housing can follow this mode of operation with benefits to all parties.

Effective research alliances should be built to advance the state-of-the-art of open building implementation. These alliances can bring together several university, private sector and public sector capabilities. The research should be “platform research” which is “precompetitive” in nature, setting out the basic principles of design, construction, product/systems development, regulation and finance. Knowledge developed internationally can be assessed for its use and adapted as needed for the special conditions of each country.

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