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A FIT-OUT Industry – Precondition for a Sustainable Building Stock

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Abstract

With increasing frequency, investors worldwide are demanding real estate portfolios assured of long-term utility value, motivated by at least three forces. The first is a cultural recognition of the necessity to shift from a “scrap and build” to a “building-stock maintenance” economy. Second are increasingly differentiated and changing requirements of building occupants, leading to cycles of “churn” and regeneration. Third is the availability of an array of building subsystems and services marketed directly to users, a new disintermediation in the demand signals to which the building industry is still adjusting. Given these trends, we are now approaching a turning point in the evolution of real estate development, independent of functional classification, in which further progress toward a resilient, post-functionalist building stock hinges on the development of a distinct FIT-OUT INDUSTRY. This paper discusses the existence of such an industry sector in non-residential real property development, and speculates on reasons similar capabilities are not yet supplying the residential real estate sector. Some conditions thwarting needed maturation of the residential “remodeling” industry in the United States are outlined because they are valid to a great extent internationally. Rejection of obsolete ideology and acceptance of new methods are suggested and finally, the “Infill” or Fit-Out service offered by a company in China is presented as an example of an approach that merits further study for possible wider application.

Keywords: Open Building; Fit-Out Industry; Sustainability

1. Introduction

A number of experts, starting with John Habraken in a speech in Taiwan in 1996 1), have argued that something called an Infill or Fit-Out Industry is needed to reintroduce the decision-making role of individual households in large housing developments. The reason he gave is that in large developments, the pressures to reduce costs and increase efficiencies by standardizing dwellings - thus eliminating the household as a decision-making agent - are producing not only uniformity but also rigidity. More recently, Frank Bijdendijk argued that a Fit-Out Industry is essential for a sustainable housing stock 2). This author has also written on this subject 3), as have many others.

The proposition on which this paper is based is that to be sustainable, a housing stock must adapt and change, in concert with changing times. Longitudinal observations in many countries show that change in

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human habitat is normal and important to understand, but that this reality has come into question in modern times. Such change sometimes happens rapidly (e.g. urban expansions, or massive building programs following conflicts or natural disasters) but more often slowly and incrementally. This has been of no interest to the international network of architects for whom, since the advent of the modern movement, change is to be resisted and remains largely unaccounted for in their form-making 4). This ignorance has had a pernicious impact on the production of residential habitat, becoming an ideology shared by the international professional network of those who steer the residential real estate industry.

Despite modernist ideology, human habitation has always been and continues to be subject to continuous piece-by-piece renewal and, by means of this process, has always sustained itself. Further, the evidence is that expenditures in remodeling or transforming dwellings in most economies are equal to, and sometimes larger than the expenditures on new residential construction. Sometimes this activity has been most pronounced in the unregulated informal sector. But it is also the case that professionals, financial institutions, regulatory bodies and companies of all kinds are profitably engaged in habitat transformation.

As much as the issues to be faced concern obsolete ideology growing out of ignorance or fear of change, technical solutions (hardware, logistics, regulations) are vitally important, because households cannot be expected to become do-it-yourself designers and builders. Households are harried enough by daily life 5), yet instinctively want dwelling places that match their lives and aspirations – a dwelling is very intimate, after all. So, buying the services to partially or fully update a dwelling should be no more difficult than buying a car or planning a family vacation.

Fundamentally, a sustainable residential building stock depends on the individual dwelling unit being recognized in the laws of property as an autonomous living cell. In addition to the current entrenched ideology and the resultant imbalance of power in the game of built environment transformation, legal definitions and building codes are problematic, as discussed below. The decision-making role of households and user groups needs to reassert itself, in the face of powerful centralizing forces, dominated by experts who are very protective of their exercise of control, justified by the need to protect human health and safety. Yet these experts, despite their overreach, have much to contribute by sharing control rather than jealously hoarding it 6).

1. A Fit-Out Industry is Active in the Non-Residential Sector

Paradoxically, the same international cabal of architects and experts who dominate residential real estate have recognized for at least six decades that change – and the uncertainty and heightened risk it brings - is profitable in non-residential real estate. Internationally, this has led to what is essentially a Fit-Out industry serving market segments such as office buildings, airports, chain services (such as Starbucks, Whole Foods, GAP, branch banks, even chain kindergartens, etc.) and increasingly healthcare facilities of various kinds and sizes.

The architecture profession has taken change in stride and benefited from it out of necessity in the non-residential market, because the bulk of such properties – particularly office and retail projects - have long been acquired using two separate interventions known as Open Building. A Base Building (what is common to all occupancies) is constructed, followed over time with Fit-Out – also called Infill, Build-out or Tenant Improvements. The latter is the bundle of services that is decided for each occupant, defined as “the installation of ceilings, floors, furnishings, and partitions of an occupancy, as well as the installation of all required building services” 7). Design and construction firms have long been organized to meet these two markets, with separate divisions of large construction companies often focused on each, along with finance, regulations and real estate enterprises organized accordingly. A variety of service companies exist to serve this market, including large specialized companies such as Herman Miller, Steelcase, Haworth, DIRTT and many others. This is an international phenomenon. While this is a very large and profitable economic engine, it has lacked sufficient study and theory to explain how it works, hindering its further maturation.

2. Why the Non-Residential Real Estate Acquisition model has not been adopted by the Residential sector

Since a professional network of architects, policy makers and residential development experts has become fully enmeshed in and accrues profit from non-residential Open Building and its articulated Base Building and Fit-Out decision and investment model, why have they not adopted the same decision-making, policy and acquisition processes for residential real estate development – particularly multi-family assets?

Several lines of thought present themselves, and may be relevant internationally.

- 1) Since the Open Building model is successful in non-residential assets, we can surmise that investors have not accepted this model in multi-family (condo) residential development because a) office and retail tenants have deeper pockets than households and are easier to bring to court when disputes arise – and consequently present a lower risk; b) office and retail tenants occupy larger and more uniform and less complex spaces than dwellings, and are thus fewer in number and simpler to install in a building than dwellings – thus reducing the number and complexity of contracts; c) Offices and retail outlets have a lower “density” and “intricacy” of utility systems per cubic meter of space compared to dwellings and as a result have a lower risk of conflict due to utility systems’ entanglement between occupancies; and c) office and retail tenants are generally more practiced in negotiating rents and contract conditions than households, making transactions faster and simpler.
- 2) Architects fear loss of control if Open Building is applied to the residential market because a) architects believe (mistakenly) that floor plans must generate architectural form and technical details; b) architects believe they know how people should live (supported by real estate marketing experts who, using ‘market research,’ claim authority about social dynamics and user group ‘profiles’); and c) architects in the residential market are essentially blinded by functionalist ideology, producing a kind of schizophrenia when forced to work with always-changing developer mandates.
- 3) Real estate practices governing residential real estate are importantly different, at least in the United States, from “commercial” real estate, as the following quotation from a real estate handbook shows:

“Let’s say that our property owner has just installed a new bathtub in a bathroom. The tub has become a **fixture**, which is a piece of personal property that has been permanently attached to real property and becomes part of it. We call this transformative process of personal property becoming part of real property **annexation**. Fixtures may not be removed before closing a sale because they are considered an improvement to the real property. Now, let’s take a moment to distinguish between fixtures and **trade fixtures**. In commercial real estate, trade fixtures are fixtures that are used in a trade or business. Unlike regular fixtures, it’s generally lawful for a trade fixture to be removed, or severed, from the real property. For example, a bookstore’s bookcases affixed to the walls of retail space rented in a mall is a trade fixture. The business may remove the bookcases after the lease is up, but it will have to compensate the landlord for any damaged caused to the retail space by removing the trade fixtures.” 8)

It is important to know if this distinction is made in other countries.

- 4) In addition, the autonomy of the dwelling unit is not yet assured legally, in real estate practices. This autonomy is unclear, at least in the common law legal tradition in effect in the former English colonies, including the United States. Under civil law, this autonomy appears to be less troubled. Most European countries operate under civil law, and the Chinese legal system, for example, is “a socialist system of law based primarily on the Civil Law,” and Chinese condominium rules are based on the condominium law of Japan that also operates under civil law 9). The impact of these legal systems on the autonomy of the individual dwelling and the incidence of legal disputes deserves more study.
- 5) Construction companies who build non-residential Base Buildings can build Residential Base Buildings. Mixed-use projects, including both non-residential and residential uses, use virtually the same base building for both. It is also the case that in such developments, the mix of uses fluctuates during the design phase and even during construction, as well as inevitably over the life of the asset.

Together, these lines of thought form the basis for a number of studies that this author believes should be undertaken in various countries where Open Building is being undertaken, and where national policies favoring the constructions of long-lasting residential assets planned for change.

3. Moving beyond Remodeling's Current Structure – Keys to a Mature Residential Fit-Out Sector

Dwelling unit remodeling is of two basic kinds: a) piece-meal work involving replacement or upgrading of single “systems” and b) ‘gut-rehabilitation,’ the process of entirely cleaning out a space and installing entirely new “Fit-Out”. The residential remodeling industry, for reasons outlined below, has not developed the organizational maturity or investment backing needed to deliver the same kind of ‘gut-renovation’ or Fit-Out services that are more normal in the non-residential sector. A number of explanations can be given. While the discussion that follows comes from an analysis of the remodeling industry in the United States, many of these findings may apply internationally, and deserve further comparative research.

The structure of the remodeling industry is complex and highly disaggregated. Residential remodeling companies are usually small firms, with low entry barriers, responding to highly disaggregated and varied demand, operating under lax regulatory oversight, and employ a host of specialists, only some of which operate with licenses. Further, remodeling is plagued by poor quality, burdensome and obscure regulations, with work taking too long, with excessive waste, and with costs that are too high. Business cycles are volatile, and there is a lack of focus on business knowledge by many remodeling contractors.

Further, the variety and small scale of most remodeling work makes capital investment in systematic data management and off-site preparation difficult. This variability, and the lack of sustained investment in what is essentially a service industry, is a barrier to growth of needed business sophistication 10.)

Unlike many other industries where the product or service can be standardized and which therefore attract substantial and sustained investment, systematizing residential remodeling – even “gut-remodeling” - has so far been unrealized. There is evidence that this is changing. The challenge is to identify repetitive problems in all “gut-remodeling” work and to find systematic solutions. This was the goal of, for example, the Matura Infill System developed and used in the Netherlands in the early 1990's that focused on two patented “installation carriers” handling piping and wiring inside dwellings, a problem that faces every ‘gut-remodeling’ project – in upgrading the older building stock and in new construction. This was an “open systems” approach to Fit-Out, managed by what was then a very advanced data-management software 11). A similar effort is evident in Japan in the NEXT INFILL concept that uses a standard and adjustable wooden frame for inner partitions and dropped ceilings, as well as a thin raised floor solution under which horizontal piping is placed. This system is licensed to various companies including INTELLEX that markets itself as a “comprehensive renovation enterprise 12).

These two examples of systematic “gut-rehabilitation,” the kind of remodeling that occurs only at intervals of 20 years or longer rather than piece-meal intermittent remodeling, is the basis for the Fit-Out Industry discussed in this paper. To go further, two questions must be asked. First, can the multitude of small-scale residential remodeling companies develop beyond their present limited state-of-the-art to become part of a distinct residential Fit-Out industry - in an incremental, “bottom-up” fashion? Or, alternatively, is a “top-down” strategy needed, in which a national - government takes the initiative to incentivize the movement toward a residential Fit-Out industry on a footing similar to the innovations in, for example, the automotive industry?

4. A “top-down” example in China – Unity Tech Group

Unity Tech Group is one of several companies in China that now deliver everything to fill-in spaces in a base building, ready for furniture. Unity Tech's solution is essentially “gut-renovation,” for new construction and renovation of older but sound residential assets. It is an example of the top-down approach.

The company's president started in business developing and selling software to manage reservations (now used in 75% of Chinese hotels), later turned to manufacturing a pharmaceutical for children (now used

in most hospitals) and who later entered into real estate development. Ten years ago, seeing a market in the Fit-Out business, he started this company that now supplies public rental housing in Beijing, and is also supplying the single-family luxury market and the condominium market. This company owes its success in large measure to the China Institute of Building Standard Design and Research that has been promoting a Chinese version of Open Building along with an Infill or Fit-Out Industry 13).

The company has delivered more than 40,000 residential infill units into Base Buildings (called skeletons in China). They are now expanding to provide their Infill solution to the healthcare market. Unity Tech has showrooms in Shanghai, Beijing and Shandong Province. Clients visit a show room and the construction site of their project, and are assigned to a company design team. Every building/unit/ floor plan is separated by account and product coding, to ensure that every product can be accurately transported to every apartment unit, in order to meet the needs of each customer.

They operate a 120,000 sq. meter manufacturing facility in Tianjin to make all sheet-materials for walls and floors, various fastening systems, a raised/warm floor system, doors and steel door frames, door hardware, etc. following ISO quality standards. They deliver materials to construction sites bundled and bar-coded per project, per building and per dwelling unit. Their patented “quick-connect” water piping system does not require licensed plumbers.

Roughly 70% of the products used in their Infill packages – mainly their patented products - are manufactured in their own facility. Commodity products such as metal studs are purchased from other suppliers. The company also operates distribution centers in a number of cities, to which every part is delivered for bar coding, whether from their own factory or from suppliers. Bar coding is by room # and processed with the right dimensions so that on-site cutting is minimal.

Their distribution centers are able to handle a variety of floor plans in a given building, supported by their data management system that connects the factory with the management software and design system so that when a building is being designed, all the relevant information (dimensions, numbers of parts and accessories needed, etc.) is sent directly to their production facility in Tianjin. This data management system enables the immediately calculation of the costs of materials, transportation, labor, taxes, etc.

They run 80% of their infill projects with their own work force (mainly in major cities) and for the 20% of their projects that are in smaller cities (they are working in 32 cities in China) they send project managers and hire local workers. The workers have been cross-trained to work on everything from the beginning to end of each project, except electricians (who need to be certified). They complete a small apartment in less than a month and are aiming for one week, aided by the use of a large number of factory produced, standardized & fault-tolerant components, improving the efficiency of on-site assembly. Almost all “wet work” is eliminated.

Version 1.0 of their data management system corresponds with about 60% factory production of elements in their Infill packages. This version is often used with traditional building structures. Due to the traditional way of building, in Version 1.0 the pipes and cables are still buried inside the structural elements of the Base Building or Skeleton.

Version 2.0 is an upgrade that depends on about 90% factory production. Company literature and an on-site visit in Beijing demonstrate an advanced level of system solutions, such as their wall and raised floor systems. In order to achieve the government’s goal of 100-year residential buildings, Version 2.0 enables the separation of pipes and wires from the Base building's structure. Wet work on site is reduced to almost 0% - only the ceiling needs to be painted.

Version 3.0 accomplishes an infill system seamlessly connected with the Base Building’s structural system, meaning that the design, building and Fit-Out or Infill system are tightly coordinated before Base Buildings are built. This produces about 95% industrialization or factory production.

They are now working on Version 4.0, which enables true c2f (customer to factory) experience, and are upgrading their design method to BIM that enables seamless connectivity between their factory MES (management execution system) and their management ERP (enterprise resource planning) system.

A company manager said that they choose to have control over most of the products in their Fit-Out packages because if more products would be supplied from the market, quality assurance would be jeopardized, because China's construction and manufacturing industry is still under-developed. In the future the market should be able to supply higher quality products, allowing Unity Tech to offer a broader product menu and offer Fit-Out at a wider range of prices 14).

5. Conclusions

It is the housing sector that has been slow to develop its own Fit-Out Industry. The underlying problem is that individual households, acting alone, have so far been unable to attain a bargaining position against a powerful professional and bureaucratic ideology that up to now has been averse to and unable to offer efficient product/service solutions in response to a market characterized by 'fine-grained' variation and change.

Yet, paradoxically, we see that a Fit-Out Industry CAN emerge and IS emerging serving the dwelling as a cell in a regenerative and sustainable building stock, as the example in China shows. This indicates that when powerful players in the game learn that it is in their interest to make it happen - that they can gain competitive advantage, learn to manage varied demand signals and make money, and that real property assets can have a longer utility value - a Fit-Out Industry can emerge and succeed.

New players coming from outside the traditional building industry - such as the Unity Tech Group - may increasingly enter the game, because the conventional residential building industry seems unable to change its habits fast enough. Architects need to catch up and provide leadership. Whether the example in China is replicable elsewhere and whether it can survive in China remains to be seen.

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