

# THE CASE FOR FLEXIBLE HOUSING

The previous chapter traced the way that flexible housing has developed as a response to external conditions and ideologies. Whilst it may be difficult to trace an ordered history of flexible housing, this does not mean that it is impossible to argue a rationale for it. This chapter makes the case as to why features of flexibility and adaptability should be included in housing design. If the first chapter looked at the 'what', the second the 'when', this one investigates the 'why' of flexible housing.

## Built In Obsolescence

At a basic level the case for flexible housing is a straightforward matter of common sense. Why, to put it simply, would one *not* design for flexibility and adaptability? Housing is volatile, subject to a whole range of cyclic, non-cyclic and trend changes, and if it is not able to respond to these changes it becomes at best unsatisfactory, at worst obsolescent.<sup>1</sup> Yet, despite the fact that dwelling is inevitably dynamic, it is too often framed intellectually and physically as a fixity. The vast majority of housing, particularly in the UK and US private sectors, is not only not flexible, but actually builds in inflexibility, and with it obsolescence. The developed world has come to accept the built-in obsolescence of consumer products, largely persuaded by the manufacturers that it is desirable to continually upgrade our lifestyles through endless consumption. However, to apply the same argument to housing, with its vastly expanded economic, physical and social implications, is much more problematic. When a recent UK Government report notes that, at current rates of replacement, a new house built today in the UK would need to last around 1,200 years in order to meet future demand, one can understand the imperative to see housing as more than a disposable commodity.<sup>2</sup> [Fig 3.1] And yet, the mindset of housing provision remains

short-term. The reasons are mainly economic. In the UK, market-led factors largely determine the shape of housing, even in the hugely diminished public sector, which largely follows the cycles of the private sector. In both sectors there is massive excess of demand over supply, mainly due to the scarcity of land or at least land in the right places. With almost guaranteed sales and well rehearsed profit margins, there is little incentive for developers to innovate or offer added value. This applies to both the design of homes and their construction. In both cases tried and tested solutions are rolled out regardless of social or physical context, or of changing



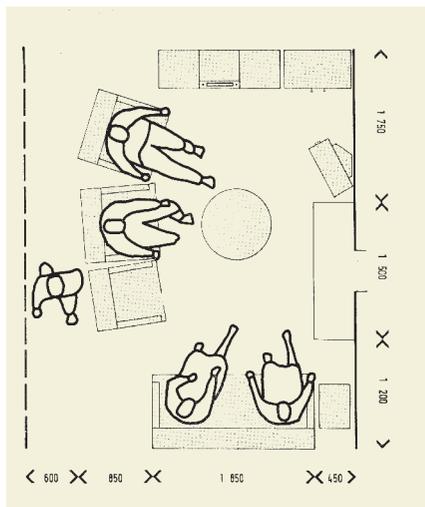
3.1 'Typical' UK house, Sheffield, UK, 1999. According to the Barker report, a house such as this will have to last 1,200 years. The combination of tight plans and inflexible construction means that even the smallest of changes are difficult to achieve.

technologies. Lack of investment in research and development has resulted in a house building industry that is unable to keep abreast of innovation in processes and technology or to cater for long term social needs.

In the UK, houses are sold by number of rooms and designated room types instead of overall floor area. Status, and thus value, lies first in the number of rooms rather than their size. Spaces are designed down to the absolute limits of their designated function, often determined through furniture layouts. This results in what Andrew Rabeneck calls tight-fit functionalism: a room that can only be used for its preconceived purpose.<sup>3</sup> It is an attitude that comes out of the modernist fixation with ergonomics, typified by pamphlets such as *Space in the Home*, issued by the Ministry of Housing and Local Government, which set down spatial standards based on typical furniture layouts and circulation clearances.<sup>4</sup> [Fig 3.2] A good example of tight-fit functionalism is the dining room. In upmarket developments it is seen as desirable to provide a separate dining room, even

though such rooms are on average used for less than 5% of the day. The dimensions of the room are established by the size of an average dining room table plus chairs and, if one is lucky, a sideboard. Circulation squeezes round the edges. The result is a long thin room, typically 3.5m by 2.2m, often with two doors, which is difficult to use for anything else, with or without the dining furniture in it. Use is thus restricted in both the short and long term. The problem is compounded when this tight-fit functionalism is applied to the whole house or apartment. Any architect who has worked with the space standard guidelines of a typical UK housing association will know that if one follows the rules to the letter, the rooms and their relationships more or less design themselves in terms of proportions and sizes. To achieve flexibility in this context requires persuasion and effort from the designer and client, accompanied by a welter of exceptions or waivers. Additionally, inherently inflexible construction techniques are the norm: internal partitions are often loadbearing and roof spaces filled with trussed rafters, both features that make future change either impossible or prohibitively expensive.

The situation is different, but not necessarily that much better, in North America or Japan. Both have a long established history of using prefabricated systems in order to provide the consumer with as wide a range of houses as possible.<sup>5</sup> Whereas in Europe, as Ole Bouman notes, housing provision remains a relic from the pre-war economy — ‘you have to take the product as it is’<sup>6</sup> — in the USA and Japan consumer choice in housing is taken seriously. Using the latest CAD/CAM technology, purchasers can call up an almost infinite array of layouts with custom finishes in an advanced version of the nineteenth century pattern book. In Japan, advanced methods of factory production still further increase



3.2 ‘Sitting around the fireplace and watching TV’, *Space in the Home*, 1963. *Space in the Home* was a design bulletin issued by the UK Ministry of Housing in 1963 setting down the whole range of ‘normal’ domestic activities and their required dimensions. The very normative assumptions of how people lived their lives was then translated by countless architects and students into very normative, and very inflexible, house plans.

the possibilities of customisation.<sup>7</sup> Whilst this gives apparent choice at the start of the process, this is not necessarily compatible with long-term adaptability; indeed, it can be argued that the more specific the design is at the start the less flexible it will be in the future since it fixes a very particular living pattern and lifestyle in perpetuity. As Stewart Brand notes in his book *How Buildings Learn*, architects as much as developers ‘tend to focus on what users want now.’<sup>8</sup>

Increasingly, what people want now is to see housing as part of a commodified lifestyle, and developers are happy to provide this in terms of surface elements such as kitchens and bathrooms, which are often the focus of the marketing pitch. The tendency to reduce housing to the status of the consumer goods merely reinforces the view of housing as product, a disposable commodity that can be moved on from once the surface has lost its attraction. Long-term considerations, including future adaptability are almost completely lost within this very short-term view.

In effect, the housing sector is building in obsolescence through inflexibility. As one housing developer told us this is not entirely accidental. Inflexibility means that once the users’ needs change, as inevitably they do, the occupants have no choice but to move. This keeps the housing market in a state of permanent demand. If flexibility were built in, occupants would be able to adapt their houses and thus stay longer in them; this would depress the housing market and limit the continuing sales on which developers depend. Housing developers actually promoting flexibility was thus referred to as like turkeys voting for Christmas.<sup>9</sup> However, housing provision demands a broader view of the subject than treating housing merely as a short-term investment

to exploit the value of the developers’ land banks. In Britain, more than half the housing stock is over fifty years old and deteriorating faster than it is being repaired, improved or replaced. The very low level of house building exacerbates this situation.<sup>10</sup> Yet, just providing additional houses isn’t enough if in a few years time those very houses have become obsolescent. The only way to get over the supply and demand problem is to build buildings that are flexible enough to accommodate new demands on the built environment such as changing demographics, ageing users and changing working patterns. We shall see this has further benefits in terms of life cycle costing, sustainability and the incorporation of new technologies.<sup>11</sup> But to accept these principles, one has to move from treating housing as a short-term fix to seeing it as one of a country’s most important assets.

## External Demographics

One of the problems of treating housing as a static commodity with fixed design parameters is that it arrives into a world of changing demographics. A mix of units that meets immediate demand might well be inappropriate in thirty, let alone one hundred, years time. Thus over the past twenty years there has been a decrease in the number of traditional family units, a higher proportion of older people, an increase on the number of single-person households, an increased demand for shared accommodation, and a growing move towards home-working. Statistical data shows that these trends will probably continue into the next decades, but they will be overlaid with as yet unseen and uncertain demographic developments. Probably the only thing that one can say with any certainty is that housing needs at the end of the twenty-first century will be different from needs and wishes today; the argument for housing that can adapt to these changing demographics becomes

compelling. Changing demographics require new architectural solutions that incorporate flexibility into new types of housing. Cultural heterogeneity also increases the need for a variable approach to housing provision. A unified, mass-produced, housing and building policy, however, blocks this demand. The standard developer house, in its basic layout and form a remnant from the late nineteenth century, seems to be at odds with an increasingly itinerant as well as multi- and cross-cultural society.

Some demographic changes can be gauged with some certainty, for instance the rise in the number of single-person households in England from around 3 million in 1971 to 6.5m in 2003, with further predicted rises to just over 10m by 2026. One can also begin to identify trends within these headline figures, such as the rise of people over the age of 65 living alone and of the young urban single. But other demographics are much more volatile. For example at a micro level, Manchester has seen a rise in its inner city population from 966 to 15,121 in the years 1991 to 2006, aided initially by the ease with which redundant warehouses (as exemplars of flexible architecture) could be converted into housing. At a macro level, it is the mass movements in migration that have always proved most unpredictable. For example, in 2003 the UK government predicted that the newly expanded European Union would result in a net inwards annual migration of between 5,000 and 13,000 people. By 2006, however, the Home Office recorded that 447,000 people from the new EU accession states had registered for work permits.<sup>12</sup> Add to this non-EU migration and one can begin to understand the diverse nature of housing demand over relatively short periods in the UK and in other countries. Each migrant group brings with it a certain set of cultural expectations with regard to



3.3 Microflat, Plan, Piercy Conner Architects, 2002.

living patterns and spaces, and yet are confronted with the fixed structures and prejudices of their adopted country's housing. There is mounting evidence that first and second generation immigrants find this spatial restriction at best uncomfortable at worst unacceptable.<sup>13</sup>

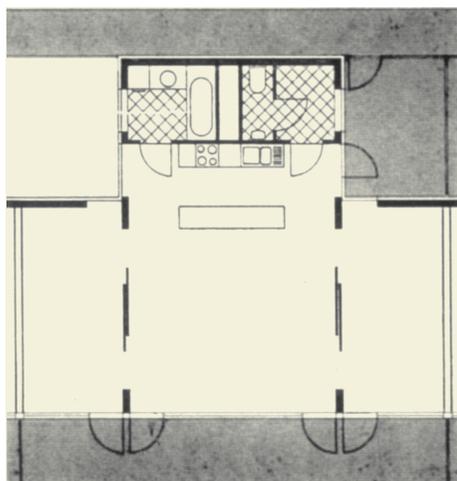
The issue of a changing demographic in relation to housing stock is nothing new. As early as 1961, the seminal Parker Morris report, produced for the UK Government, argued that 'with the greatly increased rate of social and economic change, the adaptable house was becoming a national necessity... as it would allow much easier and perhaps more satisfactory adaptation to the changing general needs.'<sup>14</sup> Despite the urgent tone, nothing much has happened in the interim, although government agencies and researchers still note the need for more flexible housing to cope with changing demographics. Thus in the UK, a recent report on the future of housing from the Commission of the Built Environment (CABE) and the Royal Institute of British Architects (RIBA) identified 'Culture, Flexibility and Choice' as one of the key emerging themes over the next twenty years, stating that: 'the nature of the individual households is forecast to continue changing. Viewed in tandem with the diverse modes of living, working and leisure time, it can be seen that our future housing needs to be flexible.'<sup>15</sup>

It is easy enough to say that housing should be designed with changing demographics in mind, less easy to actually do it. One response is to cherry-pick just one of the emerging trends and provide for it in the immediate term. This approach is apparent in the recent interest in microflats, a ‘small, efficiently designed, high quality, compact dwelling that is around two thirds the size of a conventional inner-city one bedroom apartment’.<sup>16</sup> [Fig 3.3] Designed against the background that by 2011 40% of London’s households will comprise of only one person, these apartments offer accommodation for so called ‘key workers’ and ‘young professionals’ falling within a pre-determined salary bracket. Fabricated as self-contained units with a purpose-built, prefabricated utility pod for the shower room and kitchen, these microflats can be configured into several massing options depending on site conditions. Whilst the clever design packs a lot into not much space, there are no options for horizontal or vertical additions, it is difficult to sensibly knock through walls to two units together, nor can the unit be

used for any other purpose than dwelling. Predicated on short-term economic and social pressures, the microflats in their very particular response to a very specific demographic shut down future options.



3.4 *Quartiers Modernes Frugès, Pessac, Le Corbusier, 1926.* ‘All buildings are predictions. All predictions are wrong.’ Le Corbusier’s purist housing at Pessac was famously overtaken by the impurities of occupation. [011]



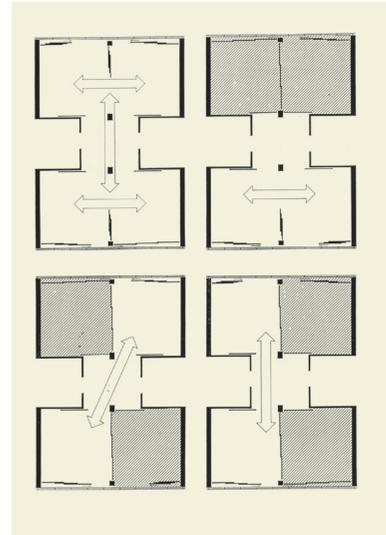
3.5 *Wohnregal Koppstrasse, Helmut Wimmer, 1999.* Typical of an approach where the designer provides an open structure for others to fill in as they wish. [135]

The challenge therefore is not just to respond to immediate pressures, but to accept the uncertainty of what might happen in future demographic trends. Steward Brand’s provocation is useful here: ‘all buildings are predictions. All predictions are wrong.’<sup>17</sup> [Fig 3.4] The only way out of this conundrum is to accept that the best one can do is to anticipate change rather than predict certainty. This calls for an openness from both the client and designer. One can identify two, apparently contradictory, approaches to providing this open future: the idea of base structures and the idea of a polyvalent organisation. In the first, faced with the volatility and diversity of potential occupancy, the reaction is to provide a frame and within it empty generic space that can be infilled and adapted over time. [Fig 3.5]

The seminal example is Le Corbusier's Dom-ino house of 1914, which is based on the principle of floor slabs supported by columns and infilled with blockwork walls and standard windows and doors, to make 'cheap, flexible dwellings'.<sup>18</sup> It is also the solution consistent with the basic tenets of the Open Building approach, in which 'the infill may be determined or altered for each individual household or tenant without affecting the Support or base building, which is the building's shared infrastructure.'<sup>19</sup>

The second approach to providing for the uncertainty of demographic change acts in apparent opposition to the first. Rather than the provision of open space, it starts with a cellular structure. [Fig 3.6] Flexibility over time is provided in two ways. First, the rooms are indeterminate in their function. Secondly, the divisions are laid out and structured so as to allow them to be connected together in a variety of configurations; often they will incorporate predetermined openings that can be filled or knocked through. Historically it is the terraced (row) house that has demonstrated these principles; although initially designed for a very specific purpose (housing the bourgeois family unit), they have proved remarkably accommodating to change. More recent schemes, such as Hellmutstrasse and Kraftwerk both in Zürich, have consciously adopted a repetitive cellular structure which, when in combination with the location of the staircase and service zones, allows multiple configurations of the units together with the ability to contract or grow over time: they hold within their plans the sense of being able to accept change over the long term. 109 146

What both these schemes also give is a diversity in the initial mix of units, with the potential for that diversity to be maintained over time. This is in contrast to much



3.6 Grieshofgasse, Helmut Wimmer, 1996. Typical of an approach that provides a cellular layout with undesignated uses. Extra flexibility is given in this case by the connections across the central hall. 119

contemporary housing, particularly in the UK, which tends to provide a single type of unit with the result that large swathes of British inner cities are being covered with one-person apartments or student housing with few, if any, public, family or community facilities. The demands of both the market and planning system thus divides society into income groups and builds differently for each group — on discrete territories with disparate management regimes and financial mechanisms. 'The result', as Habraken noted, 'is artificial segregation' and with it inflexible configurations of communities separated by economic and social barriers. For Habraken mixing and interdependency are social necessities.<sup>20</sup> In this light flexible housing not only meets the demands of changing demographics but also has the potential to contribute to the diversity and viability of urban life, something that is recognised in recent discussions about sustainable communities which stress the importance of providing a social mix and mixed use within new developments.

## Internal Dynamics

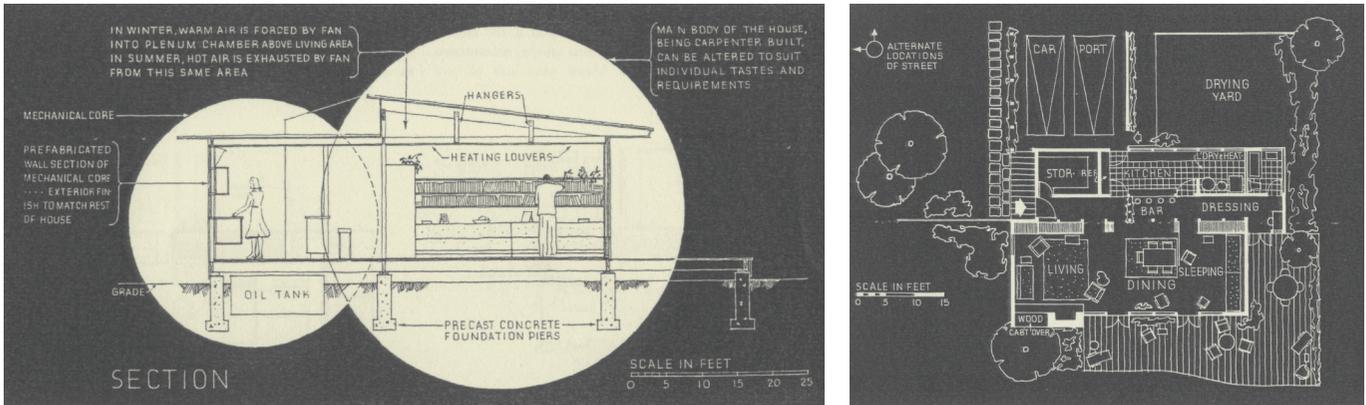
Demographics describe the external environment for housing: change here works at a macro level and consideration of how one might accommodate it generally starts at the scale of the building rather than through the design of the individual unit. Housing also needs to respond to the internal changes during the lifetime of its occupants. These internal micro changes arise at the level of the individual house or unit. If it cannot adapt then the users will have to move on, which is both socially and financially disruptive. Housing here has to be flexible enough to deal with two conditions. The first is the need to adapt to the changing needs of individuals as they grow old or less physically able. The second is housing that can respond to the changing constitution of a family as it grows and then contracts.

The first of these categories is known in the UK as Lifetime Homes, and is subject to increasing regulation (through the Building Regulations <sup>21</sup>) and also to increasing research. <sup>22</sup> The provision of housing that can be used, or easily adapted for use, by everyone, regardless of age or disability has a clear social logic. This is supported by a financial argument. In the UK, retrofitting homes for people who become disabled already costs £350 million per year. <sup>23</sup> With an ageing population, this figure is set to rise dramatically unless standards are adopted that make houses more adaptable from the start. As Richard Best, former Director of the Joseph Rowntree Foundation notes, 'with an ageing population, investment in good design will save heavy expenditure in the years ahead.' <sup>24</sup> The Rowntree recommendations are all relatively straightforward, including level access to front and back doors, wider halls and doors, windows with low sills and enough turning space for a wheelchair.

However, the recommendations for Lifetime Homes, whilst absolutely sensible in their own right, do not go far enough to provide truly adaptable housing. They mainly deal with modifications to discrete elements of design (socket heights, door widths and so on) rather than taking a more holistic view of the potential of adaptation. These aspects are covered in the second approach to design for the lifetime of a home, namely recognising the demands of changing sizes and/or ages of family or individual groups. This ability to react to changing household circumstances is clearly not incompatible with the tenets of Lifetime Homes, but takes on board a wider set of parameters. Flexible housing as envisaged here sets the aspiration that housing in general should be designed to be potentially inhabitable by everyone regardless of circumstances. For example, if a house becomes too big and therefore expensive to run, the designed-in possibility of division and letting out sections would mean that people do not have to move elsewhere. If somebody becomes physically less able through age or illness to navigate their existing dwelling, an adaptable house could provide the continued interdependence to the dweller. If economic or family circumstances change, an adaptable house should provide the possibility of re-designating existing rooms or use patterns. Whilst it might take some extra effort to design housing to cope with changing family size and structure, changing lifestyles, and ageing or disability, the flip side is that those projects incapable of growth and change will, as Habraken notes, become failures. <sup>25</sup>

Historically the vernacular house typically provided a living environment that could accommodate these changes; however, since the late nineteenth and twentieth centuries these issues have become architectural tasks. Some of the very first examples





3.8 Planning for Economy and Flexibility, Edward Stone, Stanley Sharp and Cope Walbridge, 1944. Section and Plan

The same principle of adaptability of the individual unit lies behind the Convertible House, a project developed by the Canadian Mortgage and Housing Corporation.

**107** This dwelling, which from the outside looks like a standard single house, can be divided into two dwelling units. The scenario starts with a young couple occupying one unit and renting out the other. As the needs of the homeowners change, they take over the second unit, with the second floor containing additional bedrooms for an expanded family. Once these become redundant again as children move out, the upper storey can be converted into a rental space thereby generating monthly income as the original homeowners grow old in their original home.<sup>28</sup>

Instead of transferring a planner's or architect's behaviour patterns and conceptions of living values onto the subsequent occupants, the better adaptable projects convey a plan that is as adjustable as possible to any future situation. This adaptability either comes through possible modifications in plan through movable partition walls or a general use-neutrality of a plan with regard to equipment and size. Building in this capacity for change does not dramatically increase cost<sup>29</sup> but, as the Canadian study on the Convertible House shows, is more likely save money over the long term either for the

individual owners in the private sector or the housing associations in the public sector. It is these financial arguments in support of flexible housing that are addressed in the next section.

### Financial Arguments

Sense tells us that flexibility is more economic in the long term because it limits obsolescence in the housing stock. Many have argued that flexible and adaptable housing can avoid considerable long-term capital cost through building-in the capacity to adjust to different circumstances.<sup>30</sup> All our qualitative research indicates that if technological systems, servicing strategies and spatial principles are employed that enable the flexible use of a building, these buildings in turn will last longer, and they will be cheaper in the long run because they reduce the need and frequency for wholesale refurbishment. However, there is surprisingly little quantitative data to substantiate this argument. Market research in the Netherlands has shown that people are more likely to stay in their homes if they can adapt them, and by corollary a high percentage want to move because they cannot adjust their dwellings to their needs, but the financial implications of this have not been quantified.<sup>31</sup> However, there is almost nothing in terms of hard-nosed financial assessments of flexible housing.

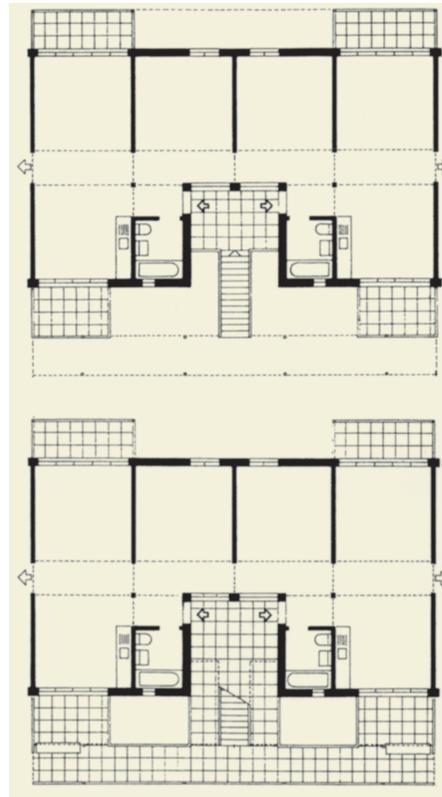
Part of the problem in understanding the financial implications of flexible housing lies in the way that the products of the housing and construction industry are costed. Everything is done on the basis of immediate expenditure, and the notion of long-term or whole life costing is rarely discussed. Although it is generally acknowledged that buildings which can be easily adapted over time will reduce running costs (to a housing association, public landlord, or home owners) whole life costing or the ‘systematic consideration of all relevant costs and revenues associated with the acquisition and ownership of an asset’,<sup>32</sup> is seldom taken fully into consideration. The whole life cost of a development includes the initial capital costs, the finance costs, repairs and maintenance, demolition and disposal, as well as running costs such as energy, water and waste.<sup>33</sup> One can thus see that flexibility is not the only principle to suffer under the regime of short-term expediency: so too do issues of sustainability. The difference is that sustainable items are beginning to be declared in terms of pay-back period, so that the relationship between up-front expense and long-term benefit becomes more transparent.

As Henz notes, ‘any upfront additional investment (which anyway is not always necessary) can be set off against long-term economic calculations such as a higher appreciation of the dwelling on the part of the user, less occupant fluctuation, and the ability to react quickly to changing needs or wants of the existing or potential inhabitants and the market.’<sup>34</sup> Such whole life costing calculations have yet to be applied to the elements of flexible housing. This is a particular loss in the public sector, where dwellings need to be upgraded on a regular basis and the cost of management and refurbishment exceeds the initial capital cost.<sup>35</sup> Maintaining properties

for the future is no longer grant assisted in the UK. Whereas a few years ago housing associations could get government grants for improvements, today, long-term maintenance of properties has to come out of a ‘sinking fund’ for each scheme.<sup>36</sup> Even a relatively simple problem such as trying to fit modern kitchen equipment into the space of a 1970s apartment has knock-on effects. Because modern kitchens generally have larger space standards to accommodate washing machines and other equipment, plans have to be rearranged — an exercise through which other rooms might be ‘lost’. This in turn results in lower rents as the rent for an apartment is determined not by its floor area but by the number of bedrooms.<sup>37</sup> The example of the kitchen is but a small part of the general problem of updating services that faces all of the managers of public sector housing in their cyclical refurbishment programmes. By designing buildings whose services can easily be upgraded and whose parts changed without too much expenditure (for example by following the principle of layering and separation of elements) costly disruption and premature obsolescence could be avoided. The implications are not just technical but also cover the human and actual cost of rehousing tenants who have either outgrown their original accommodation or else find it too big or not suitable for their physical state; again these costs, whilst real, are not considered in the initial funding of new project. If whole life costing were applied rigorously and included in the initial cost of housing, then building-in flexibility would be clearly an economic and sustainable benefit. Flexible housing in this context presents clear advantages to housing associations and local authorities, and yet within the present funding structure, and as long as whole life costing is not a compulsory part of the costing process of a building, many clients are reluctant to spend extra money up front.

If present models of housing finance, based on either direct sale or direct rent, do not encourage long-term thinking, then alternatives need to be considered for flexible housing to become economically viable. A possible model is one in which the developer is responsible not only for the construction, but also the maintenance and management of housing over an extended period.<sup>38</sup> In this way the long-term issues that flexible housing inherently addresses would, for financial reasons alone, have to be dealt with in the design. Under such a system no developer would intentionally build in non-adaptable or non-maintainable elements. Another financial model is the 'Buyrent' system developed by Hel Oosten, one of the largest Dutch Housing Corporations. In this the ownership of the base shell of the building is separate from that of the infill, with the latter being purchased by the individual while the former remains in corporate ownership. The Buyrenter has control over their space, and can upgrade it to their needs, receiving the enhanced value when they move on. As Kendall and Teicher note, this system only works when there is a clear design separation between the base building and the infill, and when the housing is designed specifically to allow the Buyrenters to adapt their dwellings to their needs, adaptations which under the financial incentive of the system go far beyond simple decoration or the addition of the odd kitchen appliance.<sup>39</sup> In this case, a system of housing finance thus effectively leads to the design of housing that is inherently flexible.

The general perception is that building-in flexibility costs more money; it is likely that this prejudice arises because flexible housing is associated with one-off experiments, which are almost by definition more expensive since they often involve the investment in



3.9 Überbauung Brahmshof, Kuhn und Fischer und Partner, 1991. Each apartment is made up of a series of indeterminate rooms, and can be joined horizontally and vertically in a variety of ways. 108

bespoke building systems.<sup>40</sup> Whether flexibility really is more expensive is difficult to measure. At the most basic level, that of designing out inflexibility, the skill lies in designing sensibly rather than throwing money at the problem. For example, the inclusion of rooms with indeterminate functions or avoiding tight-fit functionalism does not imply extra costs, just a redistribution of space. [Fig 3.9] The next stage up is the inclusion of elements that allow lifetime adaptation for age or disability. A recent study of lifetime homes found that the extra cost of providing flexibility to all dwellings in a project was estimated to be less than one

per cent of total construction costs.<sup>41</sup> Another study of a flexible housing scheme that involved extensive user consultation indicated that there were marginal increases owing to the cost of the participatory process, but quite substantial reductions (up to 15%) in the profit margins of the contractors owing to the way that the decisions arising out of the participation interrupted the construction critical path.<sup>42</sup> The most extensive cost benefit analysis is that of Kendall and Teicher who base their arguments on the experience of over one hundred built projects, and conclude that 'residential Open Building's cost benefits have proved to be substantial.'<sup>43</sup>

Less easy to evaluate are the financial benefits of the intangible elements such as user satisfaction. Again, this is an important area to research, because it is the argument of user satisfaction<sup>44</sup> that could be the selling point for spatial adaptability and flexibility in the private sector where, as we have seen, arguments about whole life costing by and large fall on the deaf ears of the developers. Whilst the excess of demand over supply means that UK housebuilders do not need to deliver a good product or high levels of customer service in order to win market share, issues of user choice and satisfaction are clear drivers in other consumer areas. As argued in a UK Government report, the house building industry must start paying attention to issues of consumer-led demand if it is to move on from its present position of working to the lowest common denominator.<sup>45</sup> There are indications that some developers are taking this on board. For example at the Millennium Village scheme by Proctor Matthews the developer was prepared to cover the extra cost of sliding walls that provided flexibility because the units with them were seen to be more desirable by potential purchasers and thus sold faster than expected.<sup>143</sup> In the same way, consumer

feedback on the private development at St James Urban village indicated that the purchasers valued the choice they were being offered and so the scheme sold quicker than a non-flexible one.<sup>46</sup> <sup>150</sup>

Overall, the financial argument for flexible housing is compelling. In market terms, it leads to higher consumer satisfaction at point of purchase or occupation, and with it increased value. In technical terms, flexible housing reduces maintenance costs, allowing as it does retrofitting and upgrading of services, thereby future-proofing buildings. In physical terms, potential obsolescence is reduced significantly, with the ability to adapt and upgrade buildings rather than pulling them down. In social terms, it limits the need for users to relocate. The point is best made by Habraken when talking about support structures with their inherent flexibility: 'the question is not whether we can afford the support town, but whether we can afford to do without it.'<sup>47</sup> However, the real financial benefits of flexible housing will only be realised once the consideration of whole life costing is taken into account, demanding a move from short-term financial expediency to long-term economic sense. Housing, as a primary asset of any nation, deserves this.

## The User

The user choice, and hence satisfaction, that flexible housing provides has far more than financial benefits: it also has social and political benefits. We have seen how John Habraken's seminal book, *Supports*, started out with a critique of mass housing. Habraken argued that mass housing suppressed the ability of the user to claim their housing unit as their own home. Instead he proposed an approach in which the dwelling should be 'an instrument for self-affirmation.'<sup>48</sup> A flexible housing

design opens opportunities to the user in three specific ways. The first is through the ability to customise, which gives the future resident a degree of choice over their future home. The second is the potential to adapt designs prior to occupation not so much as a means of customisation (which tends towards treating housing as a commodity) but as a means of involving future tenants in a participative capacity, as well as giving housing providers the freedom to change the housing mix. The third way that flexible housing empowers the user is post-completion, when a flexible design enables users to make adjustments on their own terms.

### **Customisation**

Customisation of housing concentrates on the front end of the process through providing consumer choice. At a basic level this might be in terms of finishes of floors or kitchen cabinets but also in terms of the type and size of windows, position of internal walls and preferred location within a building. At a more advanced level, it involves more complete control over the size, layout and aesthetic of housing unit. As we have seen in Chapter 2, there is a long tradition in the USA and Japan of customising housing to the user's wishes. In Japan housebuilders can typically produce 50,000 units a year using a combination of factory and site processes, with each unit customised to the purchaser's requirements. In the UK, a small but growing number of architectural firms are catering for identified consumer needs and wants through the use of government favoured construction techniques of prefabrication. Modern Methods of Construction (MMC) are seen as a tool for providing highly customised dwellings. The London based architecture firm HTA sees the future of housing as a process of mass-customisation. This will involve the final user at the heart of a process involving the designer,

developer, regulatory bodies and manufacturers — following the model of computer and car industries — in an integrated way. HTA developed a choice-based sales system for a housing scheme in Central Oakridge, England. <sup>161</sup> This demonstrated the potential for involving the purchaser in making choices in the design using a simple web-based interface, allowing the user to preview different results based on their choices. Later the model was expanded to include wider choices based on family size, location in the development, room arrangement and finishes. The steel-framed construction and standard service pods allowed plan types to be changed up to quite late in the construction process and alternative treatments to be incorporated. At Suzhou, for a Chinese client, user involvement started at the largest scale — where would you like to live (beside a canal, with a river view, near a shopping street)? — and moved down to the level of the building or block or street, to the layout and type of unit, and the fit-out of the unit. The selections would then go to the factory to be prefabricated; the user could watch their unit being constructed and finalised. The drawback of upfront customisation is that it often (but not necessarily) comes at the expense of the potential for later adaptation. Flexible modes of construction and a more flexible construction process can certainly mean more user choice, but if the systems employed are over complex they become inaccessible to the future user and for this reason will not be altered. The ability to customise housing upfront also tends to foreground the use of technology in housing production. The interrelationship of user control and technological processes is a message received from Habraken, and one that he has subsequently been criticised for, probably unfairly, as 'one of those libertarians whose proposals to tackle the inadequacies of mass housing usually focus on in the first place reorganising the product and the

technology of the product.’<sup>49</sup> The subsequent history of Open Building, which evolves out of Habraken’s principles, does indeed suggest the dangers of allowing technical issues to over-determine the design of housing at the expense of an original intent to create housing that empowers the user to claim their house as their own over time. Finally, customisation privileges the notion of housing as commodity; the user is offered choice in the same way as they are offered choice in the marketplace of consumer goods.

### The user as participant

Many of the key figures in flexible housing in the 1970s were politically motivated against exactly this commodification of architecture and housing. For them the involvement of the user was a necessary act in the democratisation of housing, and the provision of flexibility was an essential part of this. Thus Ottokar Uhl argued that: ‘Users must have the right to participate in design with architects and planners and to abandon the role of mere consumers.’<sup>50</sup> The use of flexible design here allows the user to make changes work through all stages of the housing process, from the initial design and through to occupation. One of the best documented schemes in terms of user involvement in the design process is the PSSHAK (Primary Support Structures Housing Assembly Kit) project at Adelaide Road in London. **083** The design not only allowed future tenants to be involved in the design of their homes in an informed manner, but also allowed the client to change the mix of units late in design process. [Fig 3.10] ‘Suddenly, when the housing scheme is well advanced on the drawing board, the brief is changed: the director of housing...wants many more smaller units on the site plus two eight-person houses. One of the many flexibilities in the PSSHAK process means that a change such as this simply causes



3.10 Adelaide Road Estate, Hamdi and Wilkinson for GLC, 1978. Each apartment is made up of a series of indeterminate rooms, and can be joined horizontally and vertically in a variety of ways. **083**

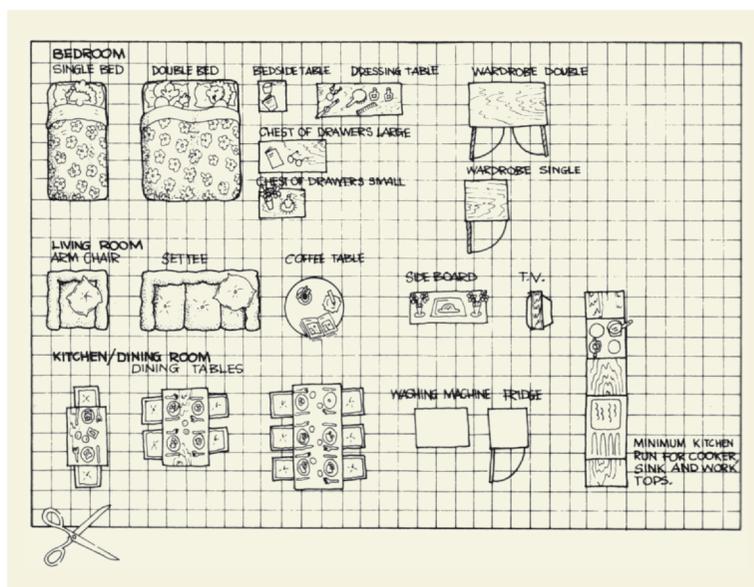
Nabs Hamdi (the architect)... to smile.’<sup>51</sup> Support and infill are separated and the basic structure allowed for larger units, including two- and three-storey houses and maisonettes. The potential for user involvement did not stop with the completion of the building but was intended to continue after occupation.<sup>52</sup> This is typical of the better approaches to participation in which the design allows intervention before and throughout the building’s life.

In the 1960s and 1970s participation was seen as a social experiment and it was usual for sociologists to accompany the process, and also to follow up with post-occupancy studies that looked at the same building again after a five or ten year period of occupation. Thus, Molenvliet, one of the early Open Building projects in the Netherlands, was monitored by sociologists who interviewed both those who had engaged in the participatory design process and those who had not. **078** They found that there was a greater likelihood that those who had not participated wanted new floor plans (43% versus 14% of those who had participated), and a greater likelihood that those who had not participated wanted to leave the scheme (42% versus 15% of those who had participated).<sup>53</sup> All the research indicates that people who have had some choice in the design of their homes

are more satisfied in the long term, which is maybe why current Dutch housing policy seeks to ensure that 1/3 of new housing construction is based on the initiative of its future occupants.

This satisfaction is not simply down to the physicality of the design; it is also a human issue to do with identification and emotional ownership. Some of the plans thrown up by the pioneering participatory schemes would not pass muster in the first year of an architecture school, and certainly defy the touchstones of design elegance, but nonetheless provide for the users' needs. [Fig 3.11] This is an example of how some of these participatory schemes challenge the norms of architectural practice. In handing over some control to users prior to occupation, the architect relinquishes the sense of authorship that is so crucial to the profession. In accepting plans that are clumsy in a designer's eye, the schemes challenge the notions of efficiency and functionalism that still underpin architectural production. Finally, in encouraging changes to be made after occupation according to the users' rather than the architects' ends, they upset any assumptions that architecture should always be judged on the basis of refinement and static object. Architects such as Herman Hertzberger and the late Otto Steidle welcome this revised value system through working with the principle of 'incomplete' space — a space and/or structure that anticipates change through infill or other appropriation. 059 060 In both cases additional space can either be added on the outside by building within the non-filled parts of the frame construction or by filling in the initially double height spaces. The case studies show many other examples of how flexible housing allows users, to a greater or lesser extent, to become decision makers in the formation and adaptation of their homes.

Whatever the motivation — commercial, political, social or simply goodwill — these schemes clearly distinguish themselves from the vast majority of current housing, in which the plan is offered up as a *fait accompli* that then prescribes future occupation. Ask of the typical house whether the user can adapt it, and the answer is generally no; one of the great advantages of flexible housing is that the answer is yes.



3.11 Adelaide Road Estate, Hamdi and Wilkinson for GLC, 1978. Aids for tenants to plan their dwellings. 083

## Sustainability

Jon Broome argues convincingly that: 'involving people in the housing process is a necessary pre-condition for a sustainable housing process.' In this context he regards flexibility as an inherent part of a sustainable system, a basic and fundamental premise to do with buildings having a long-term future, being capable of changing, and being capable of responding to changing aspirations and needs.<sup>54</sup> But it is not just in regard to

user involvement that flexible housing embeds itself into the heart of any sustainable approach to housing design. As we have seen in this chapter, flexible housing works across and integrates social, environmental and economic fields. Much contemporary sustainable design tends to concentrate on environmental issues — mainly because they are quantifiable and easier to address technically — and in doing this they miss out on the social and economic aspects. As described above flexible housing directly addresses issues of social and economic sustainability. The social aspects are not only covered through user involvement, but also in the capacity of flexible housing to accept demographic change and thus stabilise communities. The economic aspects are addressed through the long-term vision that flexible housing engenders through future-proofing and avoiding obsolescence.

The beauty of flexible housing is that if one follows through the principles, and combines them with a response to climate change, one almost inevitably arrives at a sustainable solution that integrates the complete

range of sustainable issues; however, the green rhetoric is a quiet one that eschews the superficial gestures of some sustainable architecture. Flexible housing potentially exceeds the accepted definition of sustainability — providing for the needs of the present without compromising the ability of future generations to meet their own needs — inasmuch as it is not about the avoidance of future compromise but the encouragement of coming change. There is a broader lesson to be learnt here. In the face of climate change, social fluidity and global economic change, the temptation is to pick off each as a ‘problem’ to be solved. What flexible housing shows us is that the best approach to sustainable design is not one of problem solving, because that just addresses limited aspects of the here and now, but of attitude forming across the spectrum. Flexible housing provides space for a degree of uncertainty in relation to the development of demographics, social needs and technological progress. By acknowledging change as an underlying parameter but accepting the level and extent of change as unknown, flexible housing is inherently sustainable.

### Chapter 3 Notes

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- 1 H. Priemus, ‘Flexible housing: fundamentals and background,’ *Open House International*, 18, no.4, 1993, p.19.
- 2 Kate Barker, *Review of Housing Supply: Delivering Stability, Securing our Future Housing Needs*, London: Her Majesty’s Stationery Office, 2004, p.23.
- 3 Andrew Rabeneck, David Sheppard, and Peter Town, ‘Housing flexibility?’ *Architectural Design*, 43, no.11, 1973.
- 4 ‘Ministry for Housing and Local Government,’ *Space in the Home*. Vol.6, Design Bulletins, London: HMSO, 1968.
- 5 Colin Davies, *The Prefabricated Home*, London: Reaktion Books, 2005, pp.127-29.
- 6 As quoted in: Javier Mozas, ‘Concerning the life of houses. Another way of being flexible,’ *a+t*, no.13, 1999, p.11.
- 7 Davies, *The Prefabricated Home*, p.189.
- 8 Stewart Brand, *How Buildings Learn: what happens after they’re built*, New York, NY: Viking, 1994.
- 9 This was from one of the many interviews that we carried out in the course of the research project. For obvious reasons, this particular developer wants to remain anonymous.
- 10 Between 1985 and 1996, average investment as percentage of

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- GDP in UK housing was 3.5% compared with 6.3% in Germany, 5.9% in Canada or 5% in Australia and France. The Government-commissioned Barker report identified an actual need for around 250,000 new residential units per year over the next ten years in the south of England alone, but in 2003 only 170,000 units were actually being built nationwide. As demand exceeds supply, and will continue to do so according to recent projections, Barker argued that the UK is moving towards a society facing increasing problems of homelessness, affordability and social division. Barker, *Review of Housing Supply*.
- 11 David Gann's work is influential in arguing for the consideration of new technologies and their benefits for flexibility. See: David Gann et al., *Flexibility and Choice in Housing*, Bristol: Policy Press, 1999.
  - 12 For a summary of the situation in the USA see Isaac Megbolugbe and Patrick Simmons, 'Housing Needs and Demand in the light of demographic trends to 2010: the US position', in *Meeting the Needs of the Future: the housing implications of demographic economic and social trends*, Liverpool: Housing Corporation, 1996, pp.9-25.
  - 13 Penoyre and Prasad, *Accommodating diversity: the design of housing for minority ethnic, religious and cultural groups*, London: National Association of Housing Associations, 1993; Sarah Hollingworth, 'Domestic Diaspora', MArch Thesis, University of Sheffield, 2007.
  - 14 Ministry for Housing and Local Government, *Homes for Today & Tomorrow* (also known as the *Parker Morris Report*), London: Her Majesty's Stationery Office, 1961, p.9.
  - 15 CABE and RIBA, *Housing Futures 2024: A Provocative Look at Future Trends in Housing*, London: Building Futures, 2004, pp.14-15. At a 1996 conference organised by the Housing Corporation, speaker after speaker called for flexibility to be taken into account in housing design. Housing Corporation, *Meeting the Needs of the Future: the housing implications of demographic economic and social trends*, Liverpool, 1996.
  - 16 The Microflat Company, 'What is a Microflat?' 2002, <[http://www.themicroflatcompany.com/HTML/main\\_fset.htm](http://www.themicroflatcompany.com/HTML/main_fset.htm)> [Accessed 22 March 2006].
  - 17 Brand, *How Buildings Learn: what happens after they're built*, p.178.
  - 18 Davies, *The Prefabricated Home*, p.11.
  - 19 Stephen Kendall and Jonathan Teicher, *Residential Open Building*, London and New York: E & FN Spon, 2000, p.4.
  - 20 John Habraken, 'Interventions: professional and user inputs. Design for adaptability, change and user participation', *Openhouse*, 5, no.4, 1980, p.18.
  - 21 Caitriona Carroll, Julie Cowans, and David Darton, eds., *Meeting Part M and Designing Lifetime Homes*, York: Joseph Rowntree Foundations, 1999.
  - 22 Julie Brewerton and David Darton, *Designing lifetime homes*, York: Joseph Rowntree Foundations, 1997, Joseph Rowntree Foundation; 'Lifetime Homes' <<http://www.jrf.org.uk/housingandcare/lifetimehomes/>> [Accessed 28 April 2005], Christian Woetmann Nielsen and Ivor Ambrose, 'Lifetime adaptable housing in Europe', *Technology and Disability*, 10, no.1, 1999.
  - 23 'Adaptable housing could save millions', *Building Design*, no.1297, 1997, p.4.
  - 24 Ibid. The Rowntree Foundation argue that to adopt their sixteen basic standards in new housing would only add between £100 and £300 to the cost of a three-bedroom house. This is probably an underestimate given another report that estimates it adds approximately 1% to the overall costs. See footnote 40 below.
  - 25 Habraken, 'Interventions: professional and user inputs. Design for adaptability, change and user participation', p.17.
  - 26 Jos van Eldonk and Helga Fassbinder, *Flexible Fixation: the paradox of Dutch housing architecture*, Assen: Van Gorcum, Eindhoven University of Technology, 1990, p.31. This excellent book also reproduces four pages of Leppla's diagrams.
  - 27 Edward D. Stone, Stanley Sharp, and Cope B. Walbridge, 'The new house 194X: Planning for Economy and Flexibility', *Architectural Forum*, no.77, 1942, p.119.
  - 28 CMHC, 'The Convertible House – Vancouver, British Columbia'

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- <<http://www.cmhc-schl.gc.ca/en/imquaf/afho/afadv/cohode/deflho/case2.cfm>> [Accessed 20 December 2004].
- 29 Rudolf Dirisamer et al., 'Überbauung "Wohnen morgen" in Hollabrunn', *werk-archithese*, 64, no.11/12, 1977, p.22.
- 30 Priemus, 'Flexible housing: fundamentals and background', p.19. His argument arises from the situation in the Netherlands where 'housing lasts for over one hundred years', but is universal in its application.
- 31 Elma Durmisevic, 'Towards flexible infill systems', *Open House International*, 26, no.3, 2001, p.63.
- 32 BRE, 'Whole Life Costing' 2005, <<http://www.bre.co.uk/service.jsp?id=48>> [Accessed 4 May 2005].
- 33 Beyond Green and Housing Corporation, 'Seven Principles of Sustainable Regeneration and Development', Beyond Green, 2004, <[http://housingcorplibrary.org.uk/housingcorp.nsf/AllDocuments/2798B2CA9F4E22A980256E61003FBC75/\\$FILE/7PRINCd.pdf](http://housingcorplibrary.org.uk/housingcorp.nsf/AllDocuments/2798B2CA9F4E22A980256E61003FBC75/$FILE/7PRINCd.pdf)> [Accessed 22 March 2006].
- 34 Alexander Henz and Hannes Henz, *Anpassbare Wohnungen*, Zürich: ETH Wohnforum, 1997, p.4.
- 35 Simon Allford, 'Interview with Simon Allford, AHMM', 2005.
- 36 Sue Belk, 'Interview with Sue Belk of Warden Housing', London, 2005.
- 37 Dickon Robinson, 'Interview with Dickon Robinson, Peabody', London, 2005.
- 38 This is essentially the same as the PFI (Private Finance Initiative) scheme developed by the UK Government to fund new public facilities, with the private sector responsible for the design, build and maintenance of the facilities, generally for a 30 year period. Thus far PFI has mainly dealt with the provision of new health, education and office facilities, with its use in the housing sector limited to refurbishment. It should be noted that PFI in general has been severely criticised both at the level of design and service, but also because of the real concern of handing over public buildings, with all their social complexities and responsibilities, to the private sector.
- 39 Kendall and Teicher, *Residential Open Building*, pp.227-31.
- 40 Bundesamt für Wohnungswesen Bern, 'Anpassungsfähigkeit = Nutzungsneutralität', *werk-archithese*, 64, no.11/12, 1977, p.30.
- 41 Edward Steinfeld, 'Designing adaptable housing to meet barrier-free goals', *Architectural Record*, 167, no.3, 1980, p.57.
- 42 Herbert Prader, *Partizipation im Sozialen Wohnhausbau*, Wien: Selbstverlag der Architekten Prader Fehring Ott, 1977.
- 43 Kendall and Teicher, *Residential Open Building*, p.221.
- 44 Ottokar Uhl, 'Ablesbare Partizipation', *Bauwelt*, 72, no.38, 1981, Nur Esin Altas and Ahsen Özsoy, 'Spatial adaptability and flexibility as parameters of user satisfaction for quality housing', *Building and Environment*, 33, no.5, 1998.
- 45 Barker, *Review of Housing Supply*, p.111.
- 46 John Weir, 'Interview with John Weir, Haute Future', Banbury, 2005.
- 47 John Habraken, *Supports: an alternative to mass housing*, London: Architectural Press, 1972, p.82.
- 48 *Ibid.*, p.15.
- 49 Nabeel Hamdi, *Housing Without Houses: participation, flexibility, enablement*, New York: Van Nostrand Reinhold, 1990, p.45. Hamdi is summarising, rather than endorsing, this criticism of Habraken.
- 50 Ottokar Uhl, 'Democracy in Architecture', in *The Scope of Social Architecture*, ed. by Hatch, C. R., New York: Van Nostrand Reinhold Company, 1984, p.41.
- 51 'PSSHAK Mark 2: Flexible GLC housing takes a step forward', *Architects' Journal*, 161, no.21, 1975, p.1071.
- 52 The fact that later studies have shown that the project has not been altered much is down more to the simple fact that later tenants and managers were not briefed on the potential for change, than it is down to inherent design faults. See Rebecca Pike and Christopher Powell, 'Housing Flexibility Revisited', *MADE*, no.1, 2004.
- 53 C. Richard Hatch, ed., *The Scope of Social Architecture*, New York: Van Nostrand Reinhold Company, 1984, pp.38-39.
- 54 Jon Broome, 'Mass housing cannot be sustained', in *Architecture and Participation*, ed. Blundell Jones, London, Spon 2005, p.65.