CONSUMER INFLUENCES ON THE LIFE-CYCLE OF HOUSING
WITH PARTICULAR REFERENCE TO THE EAST OF ENGLAND

House Demolitions, 1970 *(Photo: W.Fawcett)*

Ian Ellingham
St.Edmund's College

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Declaration:

This dissertation represents the original work of the author and includes nothing which is the outcome of work done in collaboration. It has not been, and is not being, submitted for any other degree, diploma, or similar qualification.

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CONSUMER INFLUENCES ON THE LIFE-CYCLE OF HOUSING

ABSTRACT

This research seeks to contribute to a better understanding of the complex life processes which occur within the housing stock, and their relationship to individual house types.

The proposition is that existing models of the long-term evolution of the housing stock require modification to fully integrate an increased importance of consumer attitudes and preferences. In particular, increased attention must be paid to factors which may change from generation to generation.

The underlying hypothesis is that the way society and individuals choose to deal with dwellings determines the direction and nature of change in the stock. Behaviour by the collective consuming population is increasingly based in the subjective attitudes they hold towards the less quantifiable attributes of different types of environments. These attitudes are subject to change over time, as one generation of consumers is replaced by another.

After considering the indications that a change has occurred in the life-cycle of housing, the project explored groups of housing consumers, defined primarily by age cohort and socio-economic characteristics, using techniques derived from psychology and marketing. The primary vehicles were surveys and interviews carried out in the Cambridge-centred area in the East of England. There were two main survey initiatives: one exposed the participants to photographs of various available house types, and one asked for responses to the subjects' own neighbourhood. Additional investigations were undertaken to relate the revealed attitude and beliefs to behaviour in the marketplace, as expressed through price movements and the propensity to refurbish.

Within the scope of a single piece of research it is not possible to address all of the aspects of this complex subject. In particular, the study focussed on single family houses, as might be occupied by a middle-income family, because in contrast to the less affluent sections of society, such consumers can exercise choice, and aspire to houses which reflect their attitudes and preferences. Therefore, they are free to develop attitudes which they can realistically express in a survey or interview environment, as well as through the houses they choose to occupy.

The work demonstrates that subjective consumer attitudes towards the less tangible attributes of house forms are now of substantial importance in the determination of the ongoing evolution of the housing stock.

CONTENTS

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PART ONE: BACKGROUND

1.0 INTRODUCTION

> "Its roof was intact; and it is the roof which makes the difference between the second and third grade of Irish country houses. Once that goes you have moss in the bedrooms, ferns on the stairs and cows in the library, and in a very few years you have to move into the dairy or one of the lodges."
>
> Evelyn Waugh (1943)
> *Bella Fleace Gave a Party*

In his short story, Waugh's primary deliberation was about not the built fabric of Irish country houses, but accompanying attitudes and evolving social fabric. He was describing the decline of an individual, a family, and, ultimately, a way of life, all of which, in turn, governed the processes affecting a very specific portion of the building stock. The utility and survival of Irish country houses had been undermined by societal changes. The factors which enabled Bella Fleace's house to be maintained or evolve to meet new needs had disappeared, leaving one elderly owner and her house as relics of a previous era. What Waugh did not anticipate was that a half-century later, yet further changes in societal attitudes and demands would bring new life and new value to those Irish country houses which survived the intervening period. This example shows the deficiency of chronological models of the housing life-cycle; obsolescence is not absolute, or one-way in nature, but only a reflection of the relationship between building form and the demands of its consumer environment.

Buildings are among civilisation's longest-lived assets, and are pervasive and essential societal resources, yet there is little research which attempts to comprehend the mechanisms which influence them over time. Complexities in attitudes towards buildings were noted by Christopher Wren who debated whether the esteem of architecture was established through absolute and permanent sets of values, or whether it was a phenomenon based "on the laws of society and man" (Soo, 1998, p.127), and therefore liable to change over time.

Although the passage of buildings through time can be quite complex, there are certain aspects which can be analysed, assessed and even quantified. Yet Stewart Brand, in his 1994 book *How Buildings Learn*, after a vivacious and entertaining discussion about the relationship of buildings and time, undertook little specific analysis, and left the reader with few useful tools or strategies for understanding, classifying, or dealing with ongoing change. Possibly, the uncertainty and complexity surrounding building life-processes encourages architects, planners, and managers to ignore aspects which may be subject to improved decision-making or forecasting.

A further reason why building life-processes are inadequately studied, may be the number of disciplines which pertain to the subject. Theories and methodologies found in economics,

management, sociology, marketing, and psychology can give insights and help to model what happens to buildings over time, especially in relationship to the human context in which they operate.

Even terminology is unclear. In the literature, the term 'obsolescence' is frequently used to relate buildings and time. Lichfield offered substantial qualification of the term, and concluded that while there might be a "comprehensive notion of obsolescence" conceptually, "there is no integrated theory on which to build" (Lichfield, 1988, p.22). Derbes (1987) supported a relative definition of 'effective age' as given by the American Institute of Real Estate Appraisers "the age indicated by the condition and utility of a structure" (p.217), explaining that chronological age has little to do with condition or utility. While it is obvious that most buildings must eventually die, rather than interpreting ageing as an undesirable process of deterioration and obsolescence, we might, as with people, accept that each stage is important in the maintenance of civilisation - so Jane Jacobs in *The Death and Life of Great American Cities* (1962, p.208-209), pointed out that different stages of building life may be of differing, but valuable, societal and economic worth. In this paper the terms life-cycle and life-processes will be used, hopefully in an unbiased manner, to avoid the presupposition that chronological ageing implies a movement towards the undesirable state of being obsolete.

Much research on the ageing of property was undertaken three or four decades ago. This material is reviewed herein and new theory proposed. New interpretations are necessary due to those decades of building and social history which separate us from that previous research. It is now necessary to explain events which people writing in the post Second War period had not seen, and did not anticipate. New theory should be consistent with events in the housing market, help to explain them, and be useful in predicting the nature of future urban environments, and how architects, planners, and managers can intervene in them.

The way in which U.K. housing ages has clearly changed since the 1960s. No longer can houses be viewed as having finite life expectancies like living organisms, but must acknowledge more complex trajectories, based on how value is assigned to various building types within an evolving society.

The way buildings are used over time relates to sustainability. Theories of sustainable consumption suggest that, contrary to many previous beliefs about buildings and urban environments, there is merit in ensuring that buildings provide valuable and valued service for as long a period as possible. While considerable effort has been expended in assessing, and possibly reducing, the amount of energy used in the creation of new buildings and other urban structures, it should be equally important that embodied resources yield a maximum of value. This suggests that building fabric should offer a long and productive life, or at least use

materials and methods which are appropriate to expected patterns of service.

Issues of building and sustainability ultimately are set in a large system of production and consumption. While an ideal societal goal might be to understand the functioning of such a global system, one element is the development of an understanding of patterns of consumption. A specific method was outlined by Van den Bergh and Ferrer-i-Caronell (2000): "To analyse the causes and consequences of consumption, one needs to develop a system of relevant relationships between determinants of consumption and environmental pressure." (p.118). They interpreted consumption patterns as being dependent upon the characteristics of individuals, social contexts, and the attributes of available products and technologies. These lead to consumption and other actions which have various environmental consequences.

This paper explores the relationship between housing and the marketplace. It will be argued that building life processes reflect ongoing changes in the match between the utility offered by various elements of the stock, and the active consumers who come to dominate the marketplace at any point in time. In particular, it presents and explores the life-cycle of housing as having its basis in ongoing change in the perceptions and values of society.

From time to time comparisons will be made with other manufactured products. The business disciplines, relating to such goods as clothing, cars, refrigerators, or colas, are aware that the marketplace is not timeless and uniform, but is composed of different niches which change over time. Yet, we seem to deal with buildings differently: Brand (1994) suggested: "Architecture, we imagine, is permanent" (p.2). While this statement might be challenged, especially on the basis of the experience and opinion from the first half of the twentieth century, it is nevertheless true that buildings are the only widely-used product which typically have a life-expectancy greater than that of its consumers. Whereas a considerable amount of research exists which has explored the relationship between current American consumers and new buildings, there have been fewer attempts to deal in a similar way with the older, ordinary, elements of the building stock. Due to differences in political and regulatory processes, there has been less impetus for such investigations in the United Kingdom.

While many of these issues apply to most types of buildings, single-family housing has been chosen for detailed exploration. This is because housing is a direct consumer good, unlike most other buildings which are components of some other good or service: moreover, home-owners obtain their housing from the available stock without the third party complexities of committees or corporate politics, so individual preferences have a more direct impact on decision-making. Initial exploration work also indicated that most home-owners were interested in offering their opinions about housing, often expressing the feeling that they were not listened to often enough by bureaucrats, politicians, managers, architects, planners, or academics.

A simple universal truth is not sought, but this research proceeds from the hypothesis that much that we experience in the urban environment only reflects ongoing consumer evaluations of communities and preferences expressed through complex marketplaces. Both evaluations and resultant consumption patterns are not static but exhibit change over time. Ultimately, changing attitudes and preferences will define much about how urban environments are formed and how they evolve. Extreme caution must be exercised about considering anything in the built environment universally or absolutely 'good' or 'bad', so an attempt has been made to avoid such judgements.

The first part of this thesis explores the literature relating to building life-processes. This considers the historical and research background, the causes and processes behind building life-cycles, the evidence that something has changed in life-processes exhibited by the housing stock, and why such a change is of interest. It also develops a set of hypotheses about how and why the processes have changed and why a new research initiative is necessary.

The second part considers economic, psychological, and business models and methods which can be used to explain and probe further into the role of consumer influences on building life-processes.

Four research initiatives follow. The first two explore attitudes and preferences held by groups of housing consumers. The second two search for evidence that consumer behaviour affects the marketplace in a manner consistent with the revealed attitudes and preferences.

The final parts discuss the findings, and present conclusions and speculations about the future of the housing stock and of the urban environment, based on the various empirical findings.

2.0 RESEARCH BACKGROUND

2.1 HISTORICAL REVIEW: WHY CONSIDER THE LIFE-CYCLES OF BUILDINGS?

Past theories and research initiatives relating to building ageing give definition through a base of theory and observations from which further investigations can be undertaken. Research typically requires some impetus. Accordingly, through the twentieth century, one can associate the pertinent literature about building ageing with wider societal perceptions and concerns. Furthermore, the historical approaches themselves can indicate the dramatic way in which popular attitudes can change. Unfortunately, there is no single ongoing strand of theory; while temporal matters should be important in the study of buildings, they tend not to be given significant attention in their own right.

A large proportion of theory has assumed that buildings and urban environments age primarily chronologically, becoming undesirable and unproductive as time passes, thereby leading to inevitable, and usually desirable, demolition and replacement, essentially new being perceived as being better. Challenges to this belief date back to the industrial revolution (Cooke, 1848), but such a model has persisted. Even proponents of housing refurbishment as an alternative to slum clearance, such as Needleman (1965 and 1967), saw the life of refurbished houses as chronologically predictable. In contrast, in the last two decades of the twentieth century, it may be difficult to argue that houses over some specified age should, in the best interest of society, be routinely demolished, or that housing life is readily predictable.

Nevertheless, one empirical strand of research, including that by Kain and Quigley (1970), Malpezzi et al (1987), and Goodman and Thibodeau (1995) has found that housing rents and values consistently decrease with the building age. Such regression studies date back to the early 1940s and have yielded a considerable range of decay of value. Malpezzi et al (1987, p.375) qualified their findings by stating that housing ageing processes are “local and diverse” and that important sub-markets may exist within geographical areas. Goodman and Thibodeau (1995) acknowledged the emergence of more complex processes, and in particular referenced the concept of ‘vintage’ as a determinant of value, quite apart from chronological ageing functions. Accordingly, the degree to which their findings may be generalised can be questioned. Consideration of the studies conducted in the United States, underlines the fact that the findings may only describe the specific markets and times during which the research was undertaken. For example, Goodman and Thibodeau’s data was gathered in Dallas, Texas, which may be a very different market area than the East of England. The stock, local economy, regulatory environment, and culture are all different.

2.1.1 Depreciation, Accounting, and Taxes

An early focus of research into building ageing resulted from the efforts of the accounting profession, in the late 1800s and early 1900s, to relate the utilisation and consumption of physical capital and relate it to production; a process which results in quantification of 'depreciation'. Cooke (1848) considered alternative depreciation models relative to establishing railway rents, because different assumptions left "...the model of computing the tenant's profit, in a state of uncertainty" (p.6).

It is readily understood how most productive assets (but not necessarily buildings or land), are consumed in use. Railway engines, for example, are purchased, used to haul trains, and ultimately, retired and sold, probably to be broken up for their metal content. Although the capital outlay occurs at the start of this process, the productive capabilities of the engine are exploited over a period of years, and the accounting discipline attempts to attribute part of the capital cost to each year it is usefully employed. For an engine, this might be done by assuming it originally 'contained' a certain number of kilometres of service, and the distance it is operated is used to allocate an amount of capital to each fiscal period. Alternatively, the expected life might be expressed in terms of years, and an equal amount of capital value assigned to each year it is in service, based on expected longevity. To do so requires an estimate of the life of the asset. While the life of short-lived assets might be easily modelled through observation, matters are less clear for long-lived assets such as buildings. The first research identified by Cowan (1965, p.1396) to create a basis for the accounting lives of buildings was a 1917 study of railway buildings conducted by the American Society of Constructional Engineers, which considered the rate of replacement of individual elements of railway stations.

As corporate taxes proliferated in the developed world, the calculation of rates of depreciation, in tax parlance often termed 'capital allowances', became increasingly important. Given the level of uncertainty about building life, varying the rates of depreciation of buildings has been widely used as a tax policy. New investments can be encouraged by reducing taxes through accelerating depreciation rates: essentially assuming that a capital asset will have a short life. So, in 1981 the United States reduced the allowable life of many classes of depreciable buildings to about half of previous levels, and in 1986, in response to perceived over-building increased them (Malpezzi et al, 1987). Such allowable lives, are used to regulate the economy, and should not be regarded as indicators of real building lives.

Buildings tend to endure, so it usually takes extended periods of time for inaccuracies to become apparent. This is a fundamental weakness in the tax and accounting research which attempted to assign specific lives to different types of buildings. Protracted longitudinal studies of building lives would be necessary to gain better data - but then due to the 'place-fixed' nature of buildings and widespread second-hand use, such studies may offer little in terms of generalisations (Nutt, 1976, p.3). Nevertheless, simple methods used for financial reporting and determination of taxes do have

the advantage of allowing ready comparisons between different companies and being difficult to subvert. Inaccuracies due to the crude model are ultimately reconciled with actual market values by recognising a capital gain or loss on disposal, although in the case of an organisation holding a high proportion of its net worth in long-lived assets, such as a property company, this reckoning can be deferred for decades. Bowie (1982) criticised inadequate provision for depreciation by property companies, which implied overstated profits and over-distribution of dividends. Such companies were effectively distributing capital as dividends, thereby undermining long-term corporate viability. The value of building assets reported on corporate balance sheets often has little relation to actual market values, even in the case of specifically property-oriented vehicles, such as property unit trusts (Ellingham, 1995). Accordingly, more advanced models as developed by Salway (1986) and Baum (1991) attempted to clarify how investment return might be affected by decreases in real building value. In particular, these studies considered industrial and office buildings, where changing demands for such attributes as increased floor-to-floor heights, air conditioning systems, higher floor loadings, and longer loading facilities can be important in establishing building market values.

Although depreciation allowances do imply specific life expectancies for different classes of buildings, time-based predictions are based on preceding economic environments. Therefore rates set in the immediate post-war period reflected population growth, urbanisation, war, depression, and a manufacturing-based economy. Malpezzi et al (1987) reviewed economic studies into building depreciation and discussed the multitude of factors which make the study of long-term rates of depreciation a difficult exercise. They observed that as supply and demand factors shifted in different communities over time, there was an impact on rents and capital values, which would influence standards of building maintenance, which in turn would affect building longevity. Their interpretation was that even deterioration of building fabric, something normally seen as a chronological function, can be interpreted as a market-driven process.

Ultimately, depreciation models of building life-processes are crude models of reality. Building life-processes can be highly irregular, market values can go up as well as down, and apparently useful and valuable buildings can be demolished to make way for something else. Caution must be exercised in using the concept of 'depreciation', as this measure is typically arbitrary, over-generalised, subject to corporate and government manipulation, and bears little relationship to the real nature of the life-process of long-lived assets.

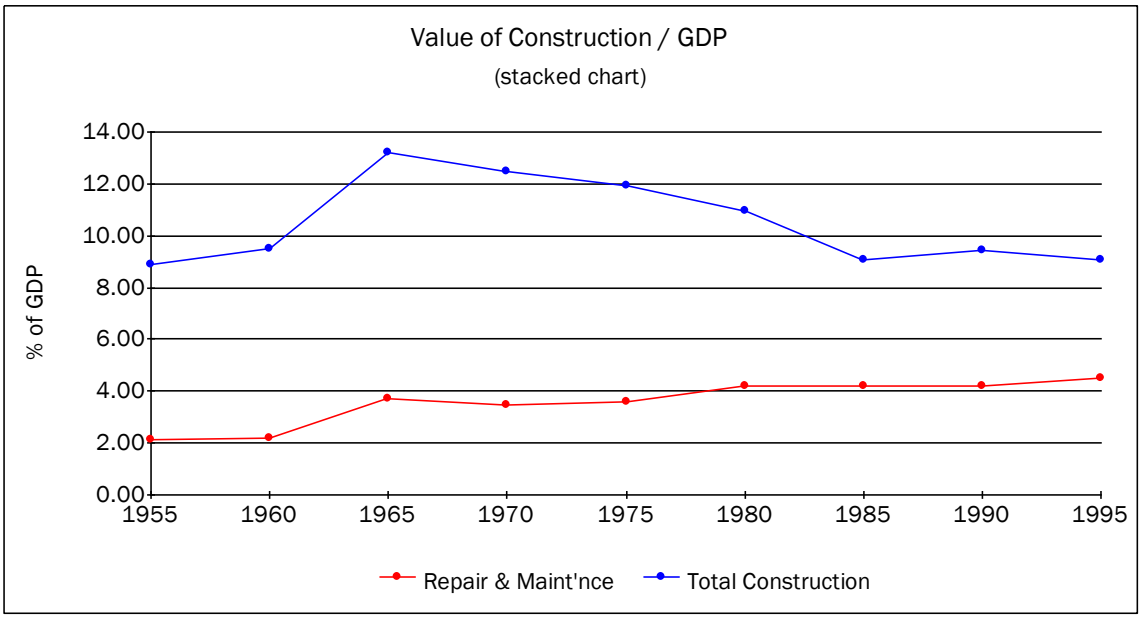
2.1.2 Economic Stimulation Through Short-Lived Buildings

Politicians and economists, especially during the interwar period, searched for methods to reduce the number and impact of recessions and depressions, and to create stable and prosperous economies. The impetus was high unemployment, combined with the development of welfare capitalism in the early twentieth century, whereby governments came to be expected to provide employment, stability, and social benefits. One of the levers available for economic stimulation was

the building industry.

The construction industry as a major part of the economies of the developed nations, was an obvious industry to manipulate - it accounted for 58 per cent of UK gross domestic capital formation in 1933 (Powell, 1996, p.118). Furthermore, construction involved many low-skill workers and unemployment in the industry had risen to 31 per cent in 1932 (Bank of England, Statistical Summary, 1935, p.126).

Exhibit 2.1. Graph of construction output vs. Gross Domestic Product (Great Britain)
Source: Annual Abstract of Statistics (various years)



Macro economic theory suggested that more construction would increase economic expenditure, expand employment, and lead to enhanced prosperity. In particular, because construction is labour intensive, "...an increase in construction is likely, through the multiplier, to lead to an increase in GDP as a whole" (Davis, Langdon and Everest, 1999, p.5). New construction represents an increase in national investment, so in the longer term, it adds to productivity, so can further raise the level of national return as expressed by GDP. One logical way to stimulate the construction industry was to build more buildings, and new construction is, in part, related to the demolition of old ones. Various papers appeared arguing that the building stock should be cycled faster[1]. Keynes, in *The General Theory of Employment, Interest, and Money* (1936), discussed the role of what could be seen as unproductive works in increasing employment. He argued that under conditions of 'severe' unemployment, public works would increase the propensity to consume, and through a multiplier effect, raise the overall employment rate. He used two examples, gold mining and the building of pyramids, and attributed part of the prosperity of ancient Egypt to their production of pyramids. "Ancient Egypt was doubly fortunate, and doubtless owed to this its fabled wealth, in that it

[1] Cowan (1965) noted: London, B. (1932). *Ending the Depression through Planned Obsolescence,* New York. and Westhagen, M. H. (1946). *A Theory of Obsolescence of Buildings, Its Relation to Public Finance, Education, and Other Services of the Community, With Special Reference to Chicago*, Ph.D Dissertation.

possessed two activities, namely, pyramid-building as well as the search for precious metals, the fruits of which, since they could not serve the needs of man by being consumed, did not stale with abundance. The Middle Ages built cathedrals and sang dirges. Two pyramids, two masses for the dead, are twice as good as one; but not so two railways from London to York" (Keynes, 1973, p.131). He also commented "It would indeed, be more sensible to build houses and the like; but if there are political and practical difficulties in the way of this, the above [burying bank notes in bottles for companies to dig up] would be better than nothing" (Keynes, 1973, p.129). By 1936, there were already examples in place: the construction of motorways and arms production had been associated with reducing unemployment in Germany, "Nazis too could conjure up equally weird schemes to boost the level of employment" (Singh, 1996, p.37). The creation of the U.S. Federal Housing Administration in 1934 was supported as an exercise in 'pump-priming', to stimulate construction thereby creating employment (Wright, 1981, p.240).

Logically, if the life of the building stock was reduced, more construction would be required, and the economy stimulated. However, this approach was not totally in keeping with Keynes' point about pyramids which were isolated from consumption, affordability, and demand: the demand for pyramids could never be saturated. This was underlined by Switzer (1963) who expressed his reservations that large-scale urban redevelopment had many diseconomies, and that arms races within 'cold wars' were probably more effective (Switzer, 1963, p.74). The replacement of vast urban areas was risky, because of the uncertainty of the social results, whereas aircraft and tanks could be repeatedly scrapped and replaced without much impact other than military retraining. Rather like Keynes' pyramids, Switzer's military hardware could be simply dumped in the desert - so production could go on without ever reaching the end of the demand, or affecting other aspects of society.

2.1.3 Improving The Urban Environment

Through most of the twentieth century it was argued that rebuilding the urban environment was a good idea, because old buildings were intrinsically bad. Eliminating them would improve human well-being. After all, most people prefer to have new domestic appliances and travel on new trains - why should buildings be any different?

Models were created to explain 'blight', sometimes associated with the presence of elderly buildings. As the word 'blight' in this form has fallen out of popular usage, a dictionary definition helps to understand the concept: The *Oxford Modern English Dictionary* (1992) includes: "4. an unsightly or neglected urban area." The *Oxford English Dictionary* (Second edition on compact disk) offers an etymology, which indicates while the word has a long usage referring to diseases in plants, its use relative to urban environments dates only from the interwar period.

One possible cause of 'blight' was a stock of elderly buildings. Lonberg-Holm (1933) compared blighted areas to old industrial equipment: blighting occurred when the equipment of cities became exhausted of usefulness, much as a machine tool becomes useless as it wears out. When the equipment became old, the factory (or city) did not perform well any more. Lewis Mumford (1938, p.237) considered the process of neighbourhood ageing as ultimately leading to situations under which an area might became unable to pay for its own internal renovation and repair. He argued that neighbourhoods and cities, like individual buildings faced limits to functional and physical life and that blight was a natural accompaniment of urban growth: "growth by civic depletion" (p.249). One assumption is that the process is one-way - that decline is irreversible: Bowie (1982, p.407) used old cotton mills which are "no longer wanted by any user" as an example of 'incurable depreciation'.

Gallion and Eisner (1963) in *The Urban Pattern* (first edition), a basic property text, explicitly stated that there is a strong association between old buildings and blight: "Except for commercial and dwelling structures that have become a sordid blight on a community, few acceptable buildings remain in use for more than 35 years, without such major alterations that they become the equivalent of new buildings." (p.328). They saw the 'filtering-down' process, by which buildings created for upper income groups eventually come to serve people with progressively lower incomes, as inevitable, assuming that only poor people with no alternatives would choose older buildings. The problem of 'obsolescence' was two-fold: not only were slums undesirable parts of the urban landscape, but "Run-down and worn-out buildings sustain themselves too long on no maintenance and low rents. It is that type of competition that sucks the life blood from productive enterprise; it is that type of competition that must be weeded out." (Gallion & Eisner, 1963, p.328). Unfortunately, they failed to explain why they believed this universally had to be the case, other than stating that the presence of old buildings deters the construction of new. Nutt et al (1976, p.14) blamed the tax system; which "...encouraged the retention of old, decayed buildings", which were major contributors to urban blight.

This was accompanied by suggestions for entirely remaking cities. LeCorbusier (1987) in *The City of Tomorrow*, of 1924, proposed that man should make a "march towards order" (p.16) based on rationality, standardisation, and efficiency. *The Nature of Cities (*Hilberseimer, 1955) argued that the problems of the cities largely resulted from the appearance of new technologies, and could only be solved through a massive programme of decentralisation and total reconstruction. Such books, especially those written in the immediate post-war period, have a particular flavour to them: the depression was vanquished and the war won through the application of management and problem-solving techniques, so surely managers and planners could do the same for urban problems. Hilberseimer (1955) quoted U.S. Assistant Secretary of State Adolph Berle: "'In finance there are techniques which are as able to rebuild and rehouse the United States as they are able to equip an army. They have not been used primarily because there was no compelling desire to use them'.

Today the compelling necessity for the use of these techniques has come" (p.284). Dalyrmple (1995) suggested this was "a kind of arms race in social pathology", based on attempts to address the deficiencies of industrial revolution society, which compelled the postwar generation to remake both cities and social programmes.

Such ideas are now of historical interest only. Less than twenty years after Bowie (1982), it would no longer be credible that all utility could be irrevocably exhausted from a Victorian cotton mill; now, it is routinely accepted that such a building might be quite desirable for some other use, perhaps as expensive flats occupied by advertising executives. Similarly, recent experience has revealed how risky subjective evaluations can be, which is underlined by consideration of the photographs, as in McKie (1969), which depict 'blighted' areas. Clearly, one generation's blight might become another's conservation area.

A change in attitudes can be noted In the 1960s and 1970s. Jacobs (1962, p.208-209) argued that older areas fill an important role in the urban economy by providing accommodation for businesses which cannot afford newly-constructed buildings. Emerging businesses, which are so important to the modern economy, often start in old buildings. Jacobs argued that rather than 'sucking the life-blood' from enterprise, a supply of old, low-rent buildings is integral to the creation and development of new businesses. If old buildings did not exist, there would be no place for "neighbourhood bars, foreign restaurants, and pawn shops" (p.200). She offered a complex view of urbanity - which has to accommodate many uses - some of which might not conform to traditional views of what constitutes a visually attractive urban pattern. However, her arguments do connect with Switzer's comments: that comprehensive, planned, replacement of large urban areas was potentially dangerous, because it might unintentionally interfere with vital parts of the workings of the city.

The concept of comprehensive regeneration of neighbourhoods, without replacing the building stock, had few precedents. The move to a societal consensus that old buildings and neighbourhoods could be transformed, perhaps offering a better quality of environment than new build, was marked by a series of confrontations. One centred around the planned comprehensive redevelopment of Covent Garden, as discussed by Anson (1981) and Esher (1981). "It amounted to a change of consciousness. The epithet 'obsolete' was now as indecent for a building as for a person" (Esher, 1981, p.143).

2.1.4 Life Cycle Costing

Life-cycle costing has appeared in the construction industry as a means of assessing alternative building products and methods. In order to undertake such analyses, appropriate assumptions about the expected life of buildings and their components are necessary. Seeley (1996, p.339) commented: "Life Cycle costing comparisons are concerned with buildings and their component parts, and the longest period over which comparisons need be made should not exceed the expected life of the building. This emphasises the need to be able to predict with reasonable

accuracy how long buildings should be expected to last."

While much research has been directed at the physical life-expectancy of building components, Malpezzi et al (1987) argued convincingly that physical deterioration often appears as a consequence of some other process, and that components are often replaced before the end of their physical lives. Flannigan et al (1989) offered a list of types of obsolescence, and noted that "Economic obsolescence is the most common form,..." (p.39). They did not attempt to detail or follow a rigid classification system, but recognised the interrelation of the various aspects of building life-processes. In particular, the role of ongoing repair and updating was acknowledged.

Ultimately, however, life-cycle costing concerns have not significantly furthered the understanding of building life-processes. There are a number of reasons for this: firstly, the discounting used in life-cycle analysis tends to make investigation of ultimate building life characteristics (as opposed to short-life elements such as interior finishes) relatively inconsequential. At a twelve per cent nominal discount rate, £100 of value in 50 years time has a present value of £0.35. Secondly, short-lived, but expensive elements, such as mechanical and electrical equipment, represent a large portion of life-cycle cost, so have become an obvious focus. Accordingly, the field is dominated by determinations of physical lives of those short-lived building elements, which are subject to periodic, and somewhat predictable replacement. Most life-cycle costing literature includes tables of 'typical lives of building components', and a short reflection on the life-cycles of buildings.

2.1.5 Housing Provision Issues

Housing was a particular concern in the wake of the two world wars: during each there was a virtual cessation of new construction and of maintenance, promises of 'homes for heroes', and, in the Second War, the destruction of 208,000 homes and serious damage done to another 500,000 (Balchin, 1998, p.9). In a context of shortage and decay due to lack of maintenance, the provision of functionally adequate housing was important. The housing literature, presented this stock of deteriorating, inadequate, old dwellings as being a problem to be solved - through drastic action, typically involving demolition and replacement (Treasury, 1947). One apparently logical way to accomplish this was to ensure that houses were demolished before they became old. "If we wish housing standards to rise rapidly in the future, it is important to reduce the normal life of houses" (Needleman, 1965, p.40). "Most people would consider a life of between 70 and 100 years to be long enough for almost all the dwellings built this century. Indeed, an average life of even seventy years may be rather long in view of the great rise in the standard of living that can be expected over the remainder of the century" (Needleman, 1965, p.42). However, Nutt et al (1976, p.9) found evidence in U.S. studies of the 1950s, that age and condition of housing did not necessarily correlate.

Considering a perspective within the first sixty years of the twentieth century, it is easy to understand why there was a close link between old housing and poor housing. There was little evidence that houses and neighbourhoods could be regenerated. The oldest elements of the stock had been built prior to the appearance of effective building and planning regulation. The Public Health Act of 1875 was referenced by Cherry (1970) as effectively terminating poorly-constructed houses, such as those constructed over cesspits, with windowless rooms, or inadequate foundations. Accordingly, when, in the first half of the twentieth century, researchers and consumers looked back, they saw that many older buildings were poorly constructed. It was true then that 'bad housing' tended to be 'old housing'.

More controversially, the privately-owned rental stock was apparently deteriorating. Ongoing rent controls, starting in 1915 with the '*Increase in Rent and Mortgage Interest (War Restrictions) Act*', encouraged landlords to maximise current income through deferring maintenance, contributing to the deterioration of the stock, a view supported by Cowan (1965) and Nutt (1976). In Cowan's view (1965, p.1401), one impact of ongoing rent controls, was to reduce yields and thereby cause landlords to defer maintenance, which caused the ultimate deterioration of individual properties and, collectively, neighbourhoods. There was an initial failure of the 1950s improvement grant programmes to improve the private rental stock: "Either the conditions were too restrictive or (as was now increasingly being suggested) rental houses had ceased to be an economic asset to their owners. Certainly a major problem facing landlords was the cost of repairs which were necessary before improvements could be carried out" (Cullingworth, 1979, p.74).

It is possible that the clearances, and a general acceptance that there was a "normal life-cycle for housing… of development, decay, clearance and redevelopment" (Cullingworth, 1979, p.94), acted to cause further deterioration in the elements of the older stock which people perceived might be vulnerable to clearance, as Cullingworth suggested. Such a prevailing attitude would tend to become a self-fulfilling prophesy: if a house was old, and the neighbouring houses dilapidated, improving a house was not likely to be a productive activity. Moreover, under the 1919 Housing, Town Planning &c Act, there was no compensation paid for a dwelling which was classed as 'unfit for human habitation', although the owner would receive the value of the underlying land, a situation which prevailed until the 1960s (English et al, 1976, p.60). This meant that maintenance of a house which might potentially be deemed 'unfit' and cleared, would logically be limited to repairs essential for short-term usage. This would prevent the older stock from being upgraded or maintained, further reinforcing the idea that, in most cases, an old house was a house nearing the end of its life.

2.1.6 Regulation of Building Life

If old buildings were seen as undesirable, it was inevitable that a variety of proposals would be developed to deal with the problem. The mechanisms of slum clearance through direct government action are well documented in such sources as English et al (1976) and McKie (1969 and 1971), but more creative possibilities were also advanced.

One suggestion was 'time and space zoning'. In such a system, building developers would be given a 'license' for the 'parking' of a structure on a site for a specific time period (Lonberg-Holm, 1933). At expiry of the license, if not renewed, the owner would have to remove the building. To ensure removal, when a building was built, the developer would post security with the licensing agency. The criteria for the granting or renewal of a license was whether or not the building remained "socio-economically desirable." Lonberg-Holm (1933, p.341) speculated: "The socio-economic desirable life span - as opposed to life spans determined by potential private profit - would at present probably be found in most cases to be less than ten years..."

Gallion and Eisner (1963, p.328) proposed a form of property taxation which would increase over time, and thereby force the demolition of buildings after about 35 years. They suggested that the renewal of the building stock "cannot continue to rely on the vagaries of chance. It must become a matter of law in an organized society." In the third edition (1975) of their book 'The *Urban Pattern*', the message remained, but was muted, more realistic and less utopian. Nutt et al (1976, p.14-15) also argued that in the U.S.A. and the U.K. the tax structure encouraged the retention of old buildings, and needed reform. In *London 2000*, Hall (1963) also complained about the taxation system. He explained "...there is no penalty on the man who gets his tax allowance and keeps the building up long after the Inland Revenue says it is fully depreciated" (p.180). He proposed that Inland Revenue should calculate the remaining life of all buildings in Britain, and, as the lives were exceeded, charge an 'obsolescence tax.' The intended effect was to periodically allow "the possibility of complete replanning" (p.180). Curiously, Hall also acknowledged that large-scale urban redevelopment can be a mistake, but thought that planners still need the opportunity to make cities "more efficient and better to look at" (p.180-181).

The implementation of such schemes on a wholesale basis had the potential of damaging cities and their economies according to Switzer (1963) and Jacobs (1962). However, the less drastic alternative, that new buildings be given a tax advantage, has been used on a selective basis to encourage area regeneration, as part of the incentive package offered in Enterprise Zones (Gibson and Langstaff, 1982, p.50).

2.1.7 Summary

Through the twentieth century there has been ongoing debate and discussion about building life processes and occasionally, whether they should be explicitly managed. Many of the concepts advanced no longer seem credible. Any serious proposal that old buildings should, as a matter of government policy, be demolished, seems an incredible proposition in the beginning of the twenty-first century. However, consideration of such approaches does show that academic, societal, and professional attitudes to the building stock (i) are far from permanent, and (ii) reflect overall world views. In a society which could still see the worse results of early urbanisation and industrial revolution, it was very easy to associate old with obsolete and undesirable - no one wanted to live in an 'old' house, because it was likely to lack amenities and could be a health hazard.

In rapidly evolving cities, people became used to dramatic change, and it would have been difficult to imagine that the physical fabric of cities might have permanence or remain desirable. In the early twenty-first century the reverse may be the case: there are extensive urban areas in which there is little apparent change, in which change may be met with hostility.

Accordingly, it is necessary to recognise that, in the early twenty-first century, there are also larger societal issues which, inevitably mould the way in which we see buildings. A view of building life-processes must now inevitably be in keeping with today's conservationist and sustainability themes.

2.2 THE CURRENT ISSUE: SUSTAINABILITY

As past theories of building life-processes were related to then-current societal issues, it is appropriate to consider current concerns about sustainability. Building life-processes can now, in part, be interpreted in terms of sustainability. In a recent report *Buildings: A New Life*, longevity of buildings was seen as a key aspect of the achievement of urban sustainability (Kingston University et al, 2001).

Sustainability is widely referenced in the media and within various academic disciplines, however as with the term 'blight', it is often used in an ill-defined manner. The Brundtland Commission discussed the concept: "Humanity has the ability to make development sustainable - to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs" (The World Commission on Environment and Development, 1987, p.8). While this definition is often quoted, considerable debate surrounds the detail.

The Consultation Paper: *Sustainable Development: Opportunities for Change* (Department of the Environment, 1998), proposed a number of priorities for buildings and infrastructure.

> Paragraph 44: "Sustainability is not just an issue for new construction. We also need to take a more sustainable approach to management of the existing building stock. We must examine the potential for economic and environmental benefits from more resource efficient refurbishment and increased recycling of demolition wastes. Increasing energy efficiency of existing buildings is fundamental."
>
> Paragraph 45: "Other objectives may also be achieved through the refurbishment of the building stock: for example, better public health; employment, or a more sustainable community if a commercial building can be used for a new purpose. We also need to consider the balance between refurbishing buildings and encouraging demolition to make way for buildings of higher environmental standard."

A number of economists have attempted to more thoroughly define 'sustainable' and 'sustainability'. Faucheux et al (1996) found a general consensus that sustainable development corresponded to a long-term non-declining level of per-capita welfare. Conventional economic measures, such as per capita gross domestic product, are widely used as indicators of the welfare of the world's population, and generally correlate with the low rates of disease and unemployment.

An important way in which the future welfare can be safeguarded is by ensuring that each generation passes an undiminished stock of capital to the next. Pearce (1993) classified capital, which consists of those potentially productive assets which are capable of being passed on to future generations, into three groups:

Natural capital: based on natural resources, including not only those which are obviously exploitable, such as minerals, forests and agricultural land, but those for which markets do not exist, such as biological diversity, clean air, and pleasant vistas.

Human capital: the base of knowledge and skills which are passed on and augmented from one generation to another.

Man-made capital: primarily consists of machines, buildings and infrastructure (roads, railways, sewage systems,...)

Thus, sustainability relative to building has a number of implications on the management of capital assets. While the most common concern is in the use of energy, there are other aspects involved in efficiently using natural capital. Obviously there is a benefit in using natural resources for as long a period of time as possible. Demolition and replacement implies further resource utilisation, as well as the disposal of the fabric of old buildings. The Brundtland Commission criticised the way in which different aspects of sustainability are often dealt with separately, and buildings are related to many elements of the economy (World Commission on Environment and Development, 1987, p.37-38). Older buildings and neighbourhoods rely on existing urban infrastructure, so minimise the need to develop new transportation and services. Furthermore, new construction often implies lower densities, which ultimately imply more energy-consuming transportation and more urban intrusion on agricultural and other rural lands. Longer-lived buildings more effectively transfer natural capital to man-made capital: clay, trees, mineral resources, and energy are transformed into buildings, which have the potential to be used by many generations.

As buildings are one of the largest elements of man-made capital, one generation can help offset its impact on the environment by passing on a useful stock of buildings. What is likely to be perceived as useful by a future generation is a matter of some complexity, discussed by Toman (1999, pg.62-63) who stated that "different social world views" affect how people form their views on environmental matters. Values and preferences can evolve over time. Essentially, in the sustainability debate, decisions are made by current generations on behalf of future generations, who may use very different criteria to form their evaluations. Powell (1996), discussing urban change, noted how different generations through the nineteenth and twentieth century had different values: "Ceaselessly the work of attrition went on as the cherished investments of one generation transmuted into the liabilities of another" (p.114-115). It seems very difficult to make judgements on behalf of future generations, and of dubious merit to act upon them. While predicting what buildings might be useful to future generations with any accuracy is probably impossible, as argued by Ronalds (1973), one generation does have the potential to pass on valuable options and opportunities to future generations. Whether they choose to use them, or not, is their decision.

Yet the Brundtland Commission offered some insight into the nature of what might constitute assets and liabilities: "Perceived needs are socially and culturally determined, and sustainable development requires the promotion of values that encourage consumption standards that are within the bounds of the ecological possible [sic] and to which all can reasonably aspire" (World Commission on Environment and Development, 1987, p.44). This is an important insight: whether some artefact is "cherished" or not, is not absolute, but probably a social and cultural construct. If better insights can be gained into how people evaluate buildings, we might be able to make them more useable to future generations.

Although there is scope for considerable debate on how to best use buildings to transmit a stock of potentially valuable man-made capital to future generations, it seems obvious that our generation should ensure that we do leave a stock of buildings which embed options which future generations might be able to exercise. The actions of a future generation in dealing with what we leave them, will be determined by their particular world view and economic pressures. This implies that any efforts which might be made to understand how successive generations perceive their needs and evaluate the capital stock which is passed on to them, will likely be of value in creating new buildings and establishing policies about existing buildings. This would improve the likelihood of buildings having value to future generations.

This reverses the situation which has prevailed through most of the previous century, which emphasised the benefits of replacing buildings. The current widely held world view, built around a sustainability theme, suggests that the 'optimal' life of buildings is a complex issue (Kingston University et al, 2001, p.2). Accordingly, buildings may be regarded as a potential gift from one generation to another.

2.3. FINANCIAL MODELS OF BUILDING LIFE-PROCESSES

2.3.1 The Origins of Building Life-Cycles

Buildings can have highly complex lives. It is apparent that building life-cycles are highly uncertain. Switzer (1968, p.2), in criticising models which saw building survival as strictly time-based, commented "...a building does not normally have a life in the sense that on a given date it will collapse about our ears as the clock strikes midnight." Baum (1991, p.134-135), considering investment properties, noted that the relationship between the market and 'building qualities' was a key aspect of buildings life-processes. Underlining this, he acknowledged not only protracted building lives, but also the possibility of an "unpredictable,... instantaneous... technological or fashion revolution" which could result in groups of buildings becoming suddenly and unexpectedly obsolete. The most rational way of considering building life is as an uncertain, market-driven economic process, which is determined primarily by the relationship of the building to the marketplace.

2.3.2 Economic / Financial Considerations

How does a business or individual decide whether to retain, refurbish, or replace a building? Conventional financial concepts, as explained by Derbes (1987), Seeley (1996), Brealey and Myers (1996), and the Royal Institution of Chartered Surveyors (1997) can be used to model building life-cycles. Discounted cash flow techniques can be presented to rationally explain how market processes assign value to buildings, yet recent theory suggests that the simpler models are incomplete. In particular, it can be shown that decision tools used by planners some decades ago, to determine when areas should be slum cleared, were imperfect, and were used with inappropriate and imprecise data.

As economic instruments, buildings offer varying levels of utility, expressed in ongoing rents and quasi-rents, the value of which can rise and fall in response to external conditions, as well as to the physical condition of the building or area. Switzer (1970) used the example of 'Victorian basement houses' which, although unchanging, still lost value. He said "...all those changes which bring about the replacement of a building express themselves through and are measurable in terms of money" (p.3). He argued that changing standards made basement housing undesirable, which was manifested in declining rents, even though such accommodation may have performed as well as ever - the market had evaporated. Overall returns embed explicit rental income, but also the utility derived by a business which uses a factory or warehouse in its production operations, from educational buildings, or from an owner-occupied house. The anticipation of future utility, as may be expressed in capital appreciation through future sale or refinancing, is also an element of overall return.

In developing models which govern building life processes, the consideration of what brings about the demise of a building illustrates this point. The concept of opportunity costs, as used in financial analysis, is useful. Abouchar (1983) stated: "The economist defines value in terms of alternative uses" (p.3), and specifically, that "the wearing out of an asset" is subject "to the behaviour of relative values elsewhere" (p.9). Hence Baum (1991) in considering building 'obsolescence', noted its relativity: obsolescence relates to other ways in which capital may be deployed. Seeley (1996, p.340) commented "...the actual physical life of a building is frequently much greater than its economic life but it is often demolished before the physical life has expired in order to permit a more profitable use of the site, or because it is found cheaper to clear and rebuild rather than to adapt the building to a change in requirements."

A building owner is at all times faced with an array of opportunities which define the value of the land and/or building in other uses, each with an associated level of risk. Typically, a building owner could continue the current use, find a new use which requires little new investment, reconstruct the building to accommodate an alternative new use, demolish the building and use the site for another purpose, or indeed sell the building and invest in some other asset class, thereby letting a new owner make the decision. A house consumer is also faced with new products in the form of newly developed and redeveloped houses, and changing neighbourhoods. It is this relationship between the value of a building in its current use, and the universe of alternative values, which establishes building life-cycles.

2.3.3. Building Lives Interpreted Through Discounted Cash Flow Techniques

Discounted cash flow techniques are frequently used to evaluate alternative business possibilities, and remain, effective ways in which to understand how the life of a building may come to an end. The fundamental valuation method, as explained by the Royal Institution of Chartered Surveyors (University of Reading, and DTZ Debenham Thorpe, 1998, and RICS, 1997) is through discounting the expected stream of future services, which might be expected to be derived from the asset. An efficient owner would, on an ongoing basis, consider alternative uses, perhaps demolishing the building, when higher risk-adjusted returns were available.

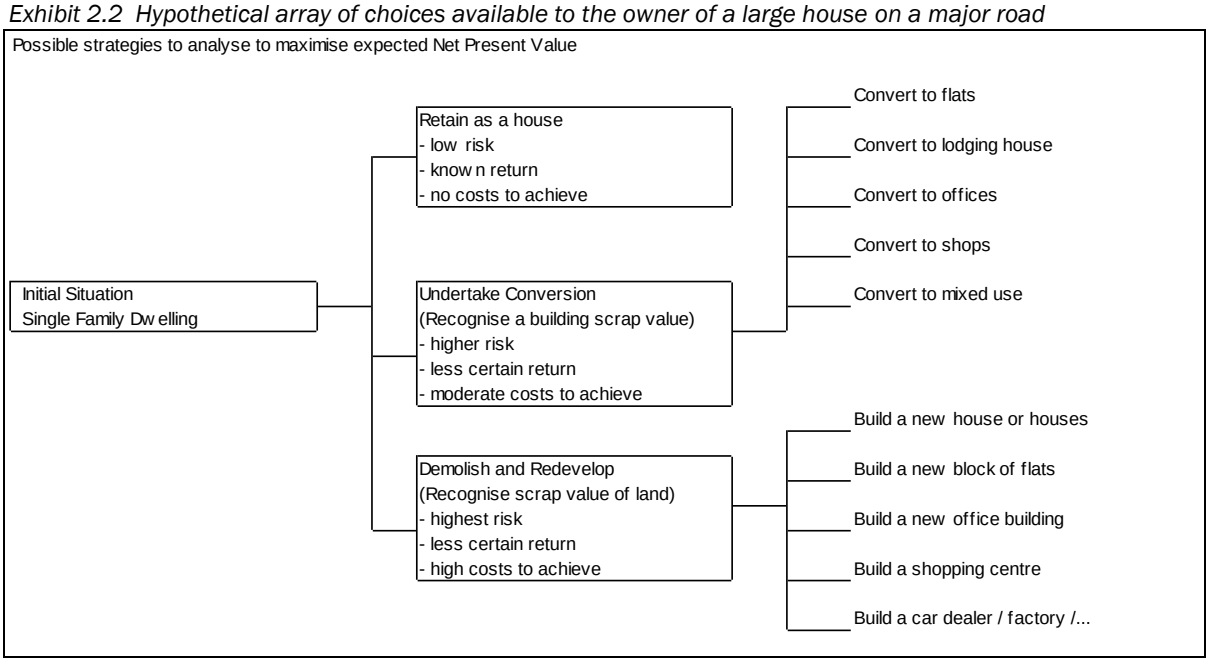
This might be modelled as disposal from current use, and realisation of higher returns, when the asset no longer retains a stock of services (rents or quasi-rents) which have a net present value in excess of the opportunity cost presented by the possibility of employing the property differently. In the building literature, this may be referred to as the 'liquidation value' of the asset (Ratcliff, 1949, p.481). Accordingly a building will tend to endure as long as:

Expected Present Value of ongoing services **>** Maximum Expected Liquidation Value

Hence, when for a building the discounted future net income (rents or quasi rents less operating costs) is less than its 'liquidation value' the owner may feasibly consider alternative courses of action, which may lead to renovation or demolition.

The concept of 'scrapping of assets' (Glautier and Underdown, 1994, p.81) originally reflected what could be realised when, for example, a piece of factory machinery was dismantled and the components sold. More generally, it is the large array of alternative opportunities to deploy the asset owner's resources. Lamden et al (1975, p.64) discussed these alternative uses in the context of the accounting concept of "useful life" which they found 'troublesome', and unobjective. They presented the case of a machine tool which, through wear, loses its tolerances over a period of years; its original owner may regard it as 'unusable', but other industries which do not demand high tolerances would find it very productive. For a piece of factory equipment, an owner might indeed realise its value as scrap metal, but might more profitably transfer it to a foreign subsidiary where low wage rates make continued operation viable. Similarly, in the property industry, an older supermarket may have an ongoing career accommodating a discount retailer. The building owner is always presented with an array of choices upon which he may choose to act. A hypothetical array has been proposed for a house located on a main road (Exhibit 2.2).

Exhibit 2.2 Hypothetical array of choices available to the owner of a large house on a major road



The 'liquidation value' for a property asset typically involves two distinct elements, a building and the underlying land. A building will tend to remain in its current usage as long as:

Expected Present Value of ongoing services **>** Maximum Expected Liquidation Value of Building and Land (together)

Thus, within the discounted cash flow framework, when the present value of the flow of ongoing services (rents and quasi-rents) falls below the combined scrap value of the buildings and land, conversion of the building to another use will become financially feasible, but demolition will not necessarily occur. When the expected present value of the stock of ongoing services for the existing building, even allowing for conversion opportunities, falls below the scrap value of the land alone, demolition and replacement of the building becomes viable. Hence, in a market economy, both sides of the formula must be considered. Demolition tends to occur when the site value, based on the potential for alternative use, has increased so that the revenue stream from the old building can be willingly sacrificed for redevelopment.

Property values are subject to change in accordance with a variety of forces, including changes in: development opportunities driven by neighbourhood changes, planning policy, the cost or availability of project financing, the state of the economy and consumer confidence, and the tax or regulatory environment, as explored in Section 2.4.

Buildings and neighbourhoods can clearly have complex life-processes, as decision-makers attempt to maximise expected financial return. Derbes (1987, p.223) used the example of New Orleans: "Many of the older structures in the French Quarter of New Orleans are on their third economic life. They have been renewed at least twice to achieve that status. Many have undergone radical change of use - all of the Bourbon Street entertainment establishments were once homes, or stores on the lower level and homes upstairs."

In the case in which the values of available redevelopment opportunities fall, buildings tend to survive. Redevelopment is not feasible due to the low possible alternative returns and the risk which would be incurred to achieve them. Jane Jacobs warned of the situation where an area of a city no longer regenerates itself "But a city area in such a situation is not a failure because of being all old. It is the other way around. The area is all old because it is a failure. For some reason or combination of reasons, all its enterprises or people are unable to support new construction" (Jacobs, 1962, p.189). Places as diverse as Lavenham, Suffolk, and Queretaro, Mexico,[2] had the bases of their respective prosperities collapse hundreds of years ago, but retained enough activity to avoid complete abandonment of the settlements, so preserved what is now a stock of valued historic buildings. This can occur in the 'ordinary' housing stock, when there is a lack of financial incentive to mobilise the resources and assume the risk needed for redevelopment (Needleman, 1965, p.42). Slum properties, as found in many American city centres, can be an extreme case in which both ongoing revenues and scrap values become very low or negative. The owners extract their last returns through maximum exploitation, however not only is it unfeasible to redevelop for other purposes, but, ultimately, it is not worth even minimal investment in maintenance or refurbishment

[2] The Martin Centre Research Society: 29th Annual Lecture Series, (1998):
- Alston, Leigh; The Buildings of Medieval Lavenham.
- Boils, Guillermo; Queretaro, Mexico: Architecture of the 18th Century.

to maintain current cash flows. At some point the buildings become unusable and often burned, at which time the site remains vacant, perhaps until it attracts the attention of 'urban homesteaders' (Clark and Rivin, 1977, p.46).

2.3.4. Complexities in Discounted Cash Flow Evaluation of Building Ageing

Application of discounted cash flow tools to understand building ageing processes, or to make decisions, is not a uncomplicated proposition. Simpler discounted cash flow methods are not complete models of the demolish/refurbish decision. The potential pitfalls can be observed by considering a model developed by Lionel Needleman (1967) to assist local authorities when determining whether to slum clear, or rehabilitate deteriorating housing. This discounted cash flow model was embedded in Appendix B: Area Improvement: Economic Aspects, to Ministry of Housing and Local Government Circular 65/69, which was issued in conjunction with the 1969 Housing Act which provided for General Improvement Areas. Sigsworth and Wilkinson (1967) and Tate and Moreton (1979) discussed Needleman's approach.

Needleman proposed a formula which discounted the future flow of benefits of housing renovation for comparison with the demolition and redevelopment opportunity. If the calculated net present value in current use (with rehabilitation) was less than the net present value of clearance and redevelopment, slum clearance was in order: The relationship can be expressed as follows (as restated in Tate and Moreton (1979) for clarity):

Exhibit 2.3: Formula to compare slum clearance and redevelopment with refurbishment

$$M = b - b\,(1+i)^{-\lambda} - ((r+p)/i)*[\,1 - (1+i)^{-\lambda}\,]$$

Where:

- M = the cost of adequate modernisation or rehabilitation of the existing houses;
- b = the cost of demolition and rebuilding;
- i = the rate of interest expressed as a proportion;
- λ = the useful life of the rehabilitated dwelling in years;
- r = the difference in annual repair costs;
- p = the difference in rent per dwelling on rehabilitated and newly built property (Tate and Morton (1979) said "used as a partial proxy for benefit differential").

This formula contained a number of latent problems. Tate and Moreton (1979, p.117) pointed out that it assumed the independence of costs and benefits, obviously improvements in services derived (annual rent) are related to the extent of any refurbishment undertaken.

The formula also contained implicit assumptions about the life-processes of the building alternatives under consideration. It accepted that the utility of a housing unit, expressed financially, never changes - that ongoing market forces have no impact on the flow of benefits. The model required

the estimation of future life expectancies for the renovated buildings, but not the new build. The new dwelling was assumed to have an infinite life-expectancy, while that of the rehabilitated building was limited and predictable, which Needleman suggested ranged from 5 to 30 years. Circular 65/69 did acknowledge and hedge the issue, and suggested that new accommodation might have a useful life of sixty years. The circular also attempted to relate the relative quality of rehabilitated dwellings as a fixed percentage of that offered by new construction, but cautiously suggested that it was a market function. In hindsight, and in contrast to the assumptions suggested by the formula, we know that many new housing estates developed during this period were ultimately perceived by the market to have major limitations, resulting in quite limited lives, while some of the rehabilitated stock now appears to be experiencing an effectively unlimited life (Ore, 2001).

A major problem in Needleman's model is the choice of the rate at which to discount cash flows. Thirty years later this remains "…one of the major challenges for management" (Mills, 1998, p.100). Needleman used the term 'interest rate' and neither his paper nor Circular 65/69 clarified how this might be determined. As the formula implies that the flow of benefits from the buildings (rent) is assigned a specific financial value not affected by inflation, the interest rate used should be a real rate. The use of a nominal interest rate (embedding a factor for inflation), would have had the effect of decreasing the attractiveness of slum clearance by excessive discounting of the perceived long-term benefits of clearance and new development. During inflationary periods, real rates may remain low, thereby amplifying the inaccuracies of decision-making using this method. Furthermore, there was no explicit attempt to deal with risk in the formula: presumably the clearance process contained greater risk than did rehabilitation, although in the mid 1960s decision-makers might not have agreed.

This examination of what should have been a rational evaluation of housing decision-making underlines the complexity of housing life-processes. In considering the literature, even within Needleman's own material, there is an obvious conflict between the possible supremacy of the market in establishing housing processes, and a concern that the market was not yielding socially desirable results. However, as was noted in the history section, this is in keeping with much of literature of the middle twentieth century, which proposed that issues of the urban environment could be resolved through good decision-making, undertaken by qualified managers, who might be able to supersede market processes.

2.3.5. Limitations in the Discounted Cash Flow Model: How Emerging Decision-Making Models May Help in Understanding the Building Ageing Process

There is ongoing evidence that conventional discounted cash flow models of building ageing processes are incomplete, and they have been subject to ongoing study. The Royal Institution of Chartered Surveyors (University of Reading and DTZ, 1998, p.30) attempted to understand why

managers often embed "ad-hoc" adjustments to discount rates, in order to generate what they believe to be better answers. In Needleman's model, the use of a nominal rate of interest, rather than a real rate may have been accepted in practice, because it helped the model give answers more compatible with the market and with managers' insights. Hodder and Riggs (1994, p.170) offered the opinion that strict application of discounted cash flow analysis may lead to inappropriate decisions, particularly when risk levels change through the life of a productive asset. More modern tools, such as the Capital Asset Pricing Model, and Arbitrage Pricing Theory, help to deal with risk factors, through the setting of return rates which are in keeping with market attitudes towards the riskiness of different investments.

Evidence of differences between government policy and the activities of the housing marketplace are not difficult to find, with government proceeding in one way, using 'rational' discounted cash flow decision tools, while the marketplace acts differently. McKie (1971, p.42) in his study of Peterborough, found that "...a tenth of the houses judged by the local public health department to be due for clearance in the next few years and more than a quarter due for clearance in 1981 were already modernised." People were investing in houses in areas which government saw as only suitable for clearance, taking the risk of loss. However, through the 1990s new theory emerged which can provide a modified interpretation of property life-processes, and can help explain the friction of the 1960s and 1970s between government and a growing and powerful marketplace of home-owners.

(a) The Role of End-Game Strategies

End-game strategies are discussed in the business literature, and are one way in which different management strategies may be important. Harrigan and Porter (1983) described alternative means to maximise returns in declining industries: they used as examples petrol marketing, and the manufacture of vacuum tubes, rayon and cigars. These are of interest because they are similar to obsolescent properties, and the concepts they described apply equally to housing. Landlords in order to extract any returns, may choose to pursue end-game strategies, which involve the deferral of maintenance, and the descent of the housing in question to progressively poorer groups of the housing-deprived, who will accept very low standards (Needleman, 1965, p.192-193). The transfer of a building into a different management or social context may prolong its use, because some managers and users are capable of extracting value from declining properties, which others would regard as suitable only for demolition. One might regard end-game strategies as valid management activities, as did Harrigan and Porter (1983).

(b) Alternative Discounting Functions

The use of hyperbolic discounting techniques was discussed in Ainslie (1992) and Laibson (1996). While this does not have the logical consistency of conventional exponential discounting, it has been demonstrated experimentally and may align better with consumer behaviour. Relative to conventional exponential discounting, the perceived value of a future benefit initially decays faster, but more value remains in the distant future. If this theory is valid, it would explain why a consumer-driven marketplace may assign different house values than a bureaucrat using mathematical tools.

(c) Real Options

A more significant addition to the debate about proper analysis techniques involves real options theory. Its proponents argue that discounted cash flows do not capture everything about business decisions, especially when discretionary control exists, such as might be exercised by managers or home-owners. This difference is a result of discounted cash flows having been originally developed to deal with passive investments, such as stocks and bonds. Accordingly, simple discounting processes treat management capabilities as a "black box" (Mills, 1998, p.54). The actions of decision-makers can, over time, reduce risk through responses to ongoing events (Hodder and Riggs, 1994, p.170). Through the 1990s option pricing methods, which were developed to price traded financial options (puts and calls), were extended to deal with 'real options'. Brealey and Myers (1996) suggested that actively managed assets be treated as bundles of financial options, which "...allow managers to add value to their firms by acting to amplify good fortune or to mitigate loss" (p.589). The link between a property or building decision and option pricing theory is to consider property as not only cash flows, but also as embedding a portfolio of opportunities, each of which can be exercised or not, by the manager or owner. Many take the form of rights to invest, analogous to 'American call options', and, at one level, may include the previously discussed possibilities to renovate, demolish and rebuild, change use, enlarge a building, or simply to undertake maintenance. These options have values which exist separately from the cash flow one might calculate from a simple projection of ongoing use (Fawcett and Ellingham, 2001). Option value relates to the volatility surrounding an asset, the time they might endure, and the specific characteristics of the opportunities.

As with traded financial options which were priced by the marketplace before good pricing theory existed, the value of embedded options is reflected by the behaviour of the marketplace. The theory and applications first emerged in the 1980s (Brennan and Schwartz, 1985), and have been developed further by Sing (1998), Amram and Kulatilaka (1999), and Copeland and Antikarov (2001). This methodology suggests why a marketplace of individual consumers might behave differently than 'rational' government agencies using mathematical techniques to assign value.

Under a simple discounted cash flow analysis, a house in an area which is likely to be slum cleared is worth only the present value of a few years of accommodation, plus the expected payment from compulsory purchase. Under an option pricing model, the dwelling may be worth more, because of the possibility that it might not be slum cleared. The most the purchaser of such a house could lose would be the original investment less the value of rent received, but there might be a substantial gain.

In particular, real option pricing theory indicates that in many cases, especially with opportunities which do not expire over time, waiting can be the most viable course of action. Sing (1998, p.22) demonstrated that option pricing models help to explain what are apparently perverse decisions made by property owners when interpreted by discounted cash flow analysis alone. He suggested that while typically any positive net present value suggests to proceed with a project, the irreversible nature of most property development decisions, and the presence of various other opportunities, mean that the 'wait and see' option is often dominant. Amram and Kulatilaka (1999, p.175-179) explored the 'wait' option relative to the development of raw land, and similarly noted that when one develops property, not only does one suffer the expenditure, but that the manager also "kills a valuable option" (p.176). Their analysis of one case "showed that the developed property value must be nearly twice the initial investment to justify immediate investment" (Amram and Kulatilaka, 1999, p.178). This explains one of the problems with slum clearance. Many less desirable areas of housing contain a range of possible futures, some of which include transition into new, more desirable forms. However, when clearance occurs and the old stock is replaced with a monolithic, centrally-owned project, few new options are created. Hence, when considering the Needleman / Directive 65/69 method, without an adjustment for the option value to be found in a 'blighted' neighbourhood, one might suggest that a proper discount rate would be very high, as Amram and Kulatilaka demonstrated. Accordingly, this suggests that complete urban redevelopment should only occur in the case of the very worst of the housing stock - rehabilitation and 'waiting and seeing' will usually dominate.

Option pricing theory suggests that a housing marketplace characterised by individual owner-occupiers who can make individual 'managerial' decisions, will probably behave differently than one which is dominated by government agencies who use neo-classical decision tools, and with the power to impose its will on landlords and tenants. Landlords could be disregarded, and residential tenants tend to hold few property options. Needleman did realise that the advantages of "...the greater flexibility of older houses in meeting changes in living standards..." (Taylor, 1973, p.153-154) and that this factor would tend to enhance the refurbishment option, however the methods to quantify such value did not exist in the 1960s. An owner-occupier can be expected to guard his property option values, so when the U.K. level of owner occupancy rose enough (it rose from 44 per cent in 1962 to 54.1 per cent in 1977), it became politically unfeasible for government to enforce slum clearance, even for the most 'rational' reasons. From today's viewpoint, full compensation to

owner-occupiers would require inclusion of an element to cover the destruction of their bundle of options, something which older theory would not have perceived.

2.3.6. Summary

It is clear, from a current perspective, that a simple discounted cash flow analysis to determine building value, such as employed by bureaucrats in determining whether to clear or rehabilitate neighbourhoods, is incomplete. In the early 1970s, as large scale redevelopment ended, the marketplace was assigning different values to housing than did government, with good reason. Accounting for option value and adjusting real interest rates for risk might explain some of the difference.

In the discounted cash flow models, the fundamental mechanisms by which consumers place values on building services are not addressed. Homeowners, through an opaque process, evaluate the future utility they expect to derive from various houses, and set capital values on them. It is within this 'black box' of consumer behaviour (McFadden, 1986, p.276) that many of the determinants of building life originate. Nutt et al (1976, p.33-34) saw processes of obsolescence as originating in the relationship between buildings and a 'behavioural system'. To understand the housing life-cycle, it is necessary to gain further insights into this system.

2.4. CLASSIFICATION OF THE DETERMINANTS OF BUILDING LIFE-CYCLES

In an attempt to understand how the value of the ongoing stock of services might change through building lives, various classifications, using a vast array of terminology, have been proposed and discussed, for example by Meij (1961), Cowan (1965), Salway (1986, p.49-60), Lichfield (1988, p.22-26), and Flannigan et al (1989, p.39-40). These generally revolved around the concept of 'obsolescence' and categorised the changes which affect both the ongoing returns from an existing building use, and the various other opportunities which may be available to the building owner. Salway (1986, p.51-58) provided an extensive and detailed list of causes of building and land "depreciation", including such categories as "legal obsolescence" and "social obsolescence". Such complex classification systems are probably useful only as checklists; in reality the factors intermingle. For example, an apparently deteriorating building exterior may result from physical deterioration of the fabric, be a consequence of management decisions made because of changes in the physical or business environment of the building, changes in aesthetic values, or a combination of these. A division is often made between internal and external factors; for example Salway (1986, p.51) termed them "physical deterioration" and "obsolescence". Internal ageing relates primarily to the wearing out of building components, while external factors relate to changes in the way buildings are used, changes in their surroundings, or changes in the way they are perceived.

Land is not usually depreciated in financial statements; because it is rarely physically depleted (exceptions would include quarrying and exploitative agriculture). It does, however, experience the impact of the external factors. Baum (1988, p.50) wrote: "Sites may depreciate through environmental obsolescence factors (for example, detrimental changes in neighbouring buildings); and given that site values may be regarded as a residual, changing supply/demand relationships will also influence site values." Carey (1993, p.42) argued that the non-depreciation of land "...will lend too great an emphasis in practice on its physical characteristics at the expense of the underlying economic reality of changes in the value of benefits expected from particular holdings." He saw that "Over time, shifts in population, in the relative affluence of particular areas and in living styles..." (p.42) potentially led to the depreciation of all fixed assets, including land.

2.4.1. Internal Factors: Physical Deterioration

Physical deterioration is the simplest aspect of building ageing, and has been a prime concern relative to accounting and taxation. Many assets are traditionally dominated by deterioration. A railway engine, for example, may ultimately have a life limited by the point when overall wear means it is better to replace the entire engine, than undertake piecemeal replacements and incurring the inconvenience of recurring minor failures. Carey (1993, p.74) found that, in 1991/92, 24 per cent of companies did not provide depreciation on all of their properties, often arguing that a high

standard of maintenance would counteract depreciation. He regarded this as an unfortunate way to regard depreciation, and that the other factors were of much greater consequence.

Technological change has made society more familiar with other forms of ageing: people have come to expect that the replacement of computers rarely results from deterioration. In buildings deterioration remains a reality, due to exposure to the elements, and ongoing use. Such physical deterioration will lower the net amount of present and future cash flows, by requiring earlier replacement or more intensive maintenance of components. Typically, replacement reserve or depreciation calculations attempt to deal with this physical deterioration, to ensure that funds are available for replacements, such as mechanical systems and roofs.

However, physical deterioration, in many cases, may be a factor of limited impact or interest. McKie (1971, p.210) offered the opinion that physical deterioration became the most important factor for housing only below "the base line provided by public health criteria" and that physically deteriorated buildings may still be found serviceable by their occupants: the importance of physical deterioration being subject to individual requirements and expectations.

Lichfield (1988, p.21) pointed out that while in modern societies, durable materials tend to be used for buildings, they still ultimately demand 'reconstruction or redevelopment'. Accordingly, maintenance and renovation are undertaken until what he terms 'exhaustion' occurs, and more substantial renewal or replacement of the entire building is required, either for the same or for a different purpose. The important point is that more insightful sources, such as Lichfield (1988) and Carey (1993), see physical deterioration as highly dependent upon exogenous influences. This is best presented, as previously noted, in the business literature associated with managing end-stage companies, such as Kantrow (1985). A manager in declining business will attempt to extract the maximum of profit, while ignoring those things which are usually associated with a growing company, such as active marketing and good customer relations. Similarly, if a manager is aware that circumstances compromise building longevity, maximisation of present value may imply the suspension of maintenance. This is Lichfield's point (1988, p.22): what he terms 'obsolescence' often drives physical deterioration.

2.4.2. External Factors

External factors tend to diminish the value of the services derived from a building. An office building might be performing its designed tasks as well as it ever did, but the attainable rents still decrease. Cowan (1965, p.1395) argued that for property it is unusual when "...the physical life of a structure is less than its functional life". Flannigan et al (1989, p.39), from a life cycle costing perspective, noted that "Economic obsolescence is the most common form,..."

McKie (1969, p.210) added a level of complexity to the problem when he stated “The assessment of functional obsolescence will vary according to the interest involved,…” Of particular consequence, when considering housing in the East of England is that, the perspective of a housing tenant or a landlord may be different from that of an owner/occupier. This can be expanded further through recognising the subjective and relative natures of ‘obsolescence’. For instance, older people who may have lived without central heating or fixed baths may see no need for them. Similarly those reliant on public transportation may regard the availability of parking as irrelevant in their assessment of a property. Ultimately, this relationship between the shades of market demand and the supply of existing buildings in any specific location is a major determinant of building life processes.

While the borders between the classification of various external factors are very blurred, and differ between the various authors, three general categories are frequently described.

(a) Functional Obsolescence

In office space, tenants of first-grade office space may come to demand column-free spaces, increased floor-to-floor heights, and more sophisticated air-conditioning. Existing buildings become less desirable, so prime office buildings, as discussed by Salway (1986, p79-80), become 'functionally degraded' and begin a new life, serving, at lower relative rents, tenants who are less demanding. This can occur as the market comes to expect, and new buildings offer, more features, perhaps column-free space, greater floor-to-floor heights, and more sophisticated mechanical systems.

Changing technology may be a cause: Cooke (1848, p.9) noted “I believe it will be found that the necessity for an early replacement of railway engines to replace those in use, is owing more frequently to the improvements which are constantly being made in the construction of them than to premature decay.” Powell (1996) noted that between 1939 and 1966 half of the cinemas in the U.K. were closed - wireless and television made cinemas less economically attractive, relative to other employment their structures or sites could find. Legislative considerations contribute to functional obsolescence in a major way, through new fire safety, legal, or health standards, an effect most apparent for highly regulated uses.

(b) Contextual Obsolescence

Contextual obsolescence deals with a building's role within a changing environment. Changing community structure may create areas which are preferred for different uses. Through a ‘filtering’ process, discussed by Clark and Rivin (1977, p.7) and Thompson (1988, p.174-183), prestigious houses may be converted to flats, rooming houses, or offices. This traditional concept, also

discussed by Ratcliff (1949) and Mumford (1938), implies that new housing is built primarily for upper income groups. Over time, it comes to accommodate progressively poorer people and ultimately, possibly, transforms into a slum. Low income households obtained their housing in the same way they obtain their motor cars today - they buy old ones. While the buildings and their original functions may have remained unchanged, the areas either were no longer desirable addresses, or other uses became more appropriate. The actions of the planning system through allowing or encouraging change in a neighbourhood, may play a substantial role in such obsolescence, due to the influence of planning processes over the evolution of the city, and the value of sites for redevelopment.

Growth pressures on cities can create the incentive to redevelop existing properties. Powell (1996, p.114) pointed out the historical influence of new supply: "One cycle of activity begat another as building boom eventually led to obsolescence boom", while "Quiet decay proceeded in the country." This type of obsolescence is a case which does not exist for many other productive assets: factory equipment can often be relocated, while most buildings are immovable.

Not all context is physical. Financial conditions can act in arbitrary and self-fulfilling ways. 'Red-lining' is a term used in the United States, whereby certain areas (usually inhabited largely by minorities) are perceived as likely future slum property. When an area was 'red-lined', the FHA stopped underwriting mortgages, making purchase difficult, thereby undermining values (Wright, 1981, p.247-248). Gardener (1998) reviewed policies developed by many U.K. banks and building societies which prevented lending on flats in buildings of over four floors. "This policy, used by almost all the big lenders, is forcing buyers to look at alternatives and leaving vendors virtually unable to sell.... Council blocks in expensive areas have become popular and prices have rocketed, but 'no-lending' policies could send prices crashing." Buildings, regardless of the specifics of their various locations, can lose a large part of their value because of changes in the lending context.

(c) Aesthetic Obsolescence

What Nicholetti (1968, p.413) termed 'aesthetic obsolescence' is an obvious factor in buildings, although much of the literature dealing with asset life-cycles ignores it entirely, perhaps because it has little impact on many capital assets, such as industrial equipment. Moreover this factor is based in subjectivity. Salway (1986, p.52) speculated about some ageing properties: "Either fashions in architectural style may have changed, or alternatively, the building may simply look old and fail to satisfy an aspiration to be associated with up-to-date products." Quite separately from consideration of economic processes, there have been many attempts, to understand why certain artefacts come to be regarded as desirable. Nicoletti (1968 p.414) expounded upon an "ideal of beauty", based on transient "fashion and taste." He proposed a societal "desire to conform" and that objects which "represent our personality" are most valued. This concept is also reflected in the work of Cooper

(1976) and Proshansky (1983) who suggest that people will tend to value buildings which align with the image they hold of themselves.

Thus, aesthetic processes and transformations are highly significant. Lichfield (1988, p.22), introducing his discussion of obsolescence, commented: "...It follows that during its life the fabric will appear as no longer suited to the later contemporary eyes... And it will be perceived differently by different generations. Thus in any moment of time there will be varying degrees of what will be perceived by occupiers as 'obsolescence' in buildings,..." Subjective opinion about design can cloud, or even dominate, what otherwise might be simple, rational economic classifications and decisions about how to deal with buildings. Various fashions of design become undesirable, while others may rise in esteem.

Aesthetic concerns can receive official recognition and protection. Historical designation formally acknowledges the design, historical context, or an association with celebrated persons, by making the site unsuitable for conversion or demolition. The liquidation value of the property is effectively reduced, because it cannot be readily realised because of the restrictions imposed.

Thus, property decisions made by the hardest-nosed property owner can be based on the fashion whims of the marketplace. What might be otherwise useful buildings, can come to be renovated, converted, or demolished based on the market's opinions on how the visual aspects of buildings coincide with what we wish to express about ourselves, individually or corporately.

2.4.3. Limitations of Use of Classification Systems

(a) Separation of factors:

The lack of clarity of the divisions between types of ageing processes limits their use. Medhurst and Lewis (1969, p.59) in their research, found inter-relation between the factors: "Building decay, functional obsolescence and environmental decay are closely interwoven. Each may be caused independently of the others, but each may also lead to either, or both, of the others." The 'filtering' process is an example. While in the case of an individual building, change in use may be forced by the surrounding environment, as a whole the area may be changing as the result of shifts in the fashion preferences of successive cohorts of consumers.

(b) Curables and Incurables

Separation of curable and incurable building ageing processes was attempted by Salway (1986) and Derbes (1987). While this is an attractive division, and may function for some building elements

such as mechanical systems, for complete buildings or urban areas, dividing the curable from the incurable, with any degree of confidence, may be effectively impossible.

Ageing processes which require financial input for maintenance or updating have the effect of reducing the present value of ongoing services. If large enough, such demands will reduce the net present value to a level where the liquidation value opportunities become attractive, possibly compromising the life of the building. Salway (1968, p.53) said that when "...the costs involved are so high that the economic solution is to demolish and rebuild rather than repair; the problems of deterioration are then deemed to be effectively incurable." Derbes (1987, p.220) agreed: "The test for curability is economic feasibility." Accordingly for buildings, very little is absolutely incurable. The only limiting factor will ultimately be the relationship of alternative expected present values achievable, as may be augmented by the benefits of protecting any option values. McKie (1969, p.42) within the context of planner-driven slum clearances, argued that the problem might be that of finding the appropriate use for a building or an area; a redefinition of function may effectively 'cure' obsolescence.

Furthermore, physical incurability may be the result of external factors, which have caused maintenance to be deferred. Again, using a railway example, if changing social conditions, such as a higher car ownership means that trains are used less, associated railway buildings may go unmaintained, thereby deteriorating, perhaps lapsing into dereliction.

(c) Predictability

There is a variety of opinion about the extent to which building life processes might be predictable; some studies attempted to create tables of building life-expectancies. To investment analysts, taxation authorities, and valuers, some level of predictability is attractive.

Ratcliff (1949), who did recognise the uncertain processes surrounding building ageing, felt that obsolescence was not chronological, and that it was, at least in part, fashion driven. He said: "About the only policy that can be effective is that of building only that housing which represents the latest technological developments, which reflects the latest fashions, and which gives recognition to basic social trends. To build something already out of date is to suffer a loss before the structure is completed" (p.483). One might argue that Ratcliff's comments, are, when viewed from 2001, incomplete. The stability of the recent past, when compared with the economic and technological turmoil of the fifty years before Ratcliff's book, means that we may have a better basis upon which to base projections, and with the availability of computers and techniques of consumer and psychological research, we have better tools.

It might be difficult to even recognise when a building has reached the end of its useful life. McKie (1971, p.42) cautioned that planners seemed to be less able to judge obsolescence than the marketplace, and were prone to believe that "an appearance of physical obsolescence" correlated with a level of "functional obsolescence". His research, largely conducted in Peterborough, demonstrated that some of what he termed 'twilight areas' retained functional adequacy. He felt that a lack of popular interest in widespread redevelopment probably meant that small-scale refurbishment of the area, rather than redevelopment, was in order. McKie's analysis of the situation was that clearance could not be presented as a benevolent operation to save communities from private sector landlords, but had become "an emotive battle between the home-owner and the bureaucrat" (p.42).

Some uses will experience internal evolution which may take predictable paths. The nature of business life-cycles has been widely discussed, with phases corresponding with nativity, childhood, adolescence, maturity, decline, and ultimate death. As with people, we know that there will be a life story, but its course is not completely predictable. An example of some predictability is the impact of endogenous evolution upon seniors' housing facilities, a process described in Ellingham (1996). When built, new seniors' flats typically appeal to a population aged in their early seventies. Ten years later, the members of the original tenant population are in their early eighties, at which point the prospect of a building filled with frail older people dissuades younger seniors from moving in. Predictably over time, the building houses a very different population than that for which it was designed, and may exhibit a wide variety of deficiencies, leading to dissatisfaction among its occupants and managers, and requiring renovation well before physical deterioration is evident. Similarly, as discussed in Etobicoke (1982), schools built in newly developed suburbs, have often been planned in anticipation of the first wave of young children. Over time, the neighbourhood undergoes predictable evolution and the number of children decreases, leaving the educational authority with surplus capacity.

The fact that building ageing processes are "almost certainly nonlinear and quite likely nonmonotonic" (Goodman and Thibodeau, 1995, p.40) should not discourage attempts to understand them. In particular, it is possible that evolution in certain types of buildings can be predicted.

(d) Special Characteristics of Buildings

It is tempting to treat buildings and urban environments in the same way as other manufactured artefacts, however buildings have properties which make them different from other consumer products or factory equipment. In particular:

(i) Buildings are difficult to move. This almost totally eliminates the possibility of moving into different market environments, either functionally or geographically. Old machine tools can be moved to other industries or other countries.

(ii) Buildings are almost always unique:

- Each is located on a specific site, which embues it with specific characteristics;
- Many buildings are built to a particular design, in response to an owner's specific requirements;
- As a result of their long lives, even buildings which were originally similar may be heavily modified.

(iii) A property's future worth may be an important consideration during initial purchase. Therefore, as pointed out by Levinthal and Purohit (1989, p.39), consumers will treat purchases partly as capital investments, so will attempt to evaluate future values, as well as shorter-term benefits.

(iv) There are often significant costs in accessing liquidation values. 'Exit barriers' were explored by Harrigan and Porter (1985, p.284) relative to fixed-asset based businesses in general: "These barriers can be insurmountable even when a company is earning subnormal returns on its investment." An asset may remain in use, only because it cannot be easily liquidated. The high level of regulation of urban property creates such barriers, including the compensation and notice required to remove tenants, or the need to secure complex planning permissions. Malpezzi et al (1987, p.387) noted that, in the U.S.A., stringent clean-up standards mean that industrial sites can become 'untouchable'. The Economist (1995a) stated that Chicago contained approximately 2,000 'untouchable' industrial sites, consisting of 16,000 acres of abandoned land. Obstacles to the redevelopment of properties destroy opportunities, so encourage the retention of any existing buildings and uses.

(v) Buildings are inescapably intertwined with matters of land. Bowie (1982) stated a frequently-held property understanding; that invariably real growth lay in land, not in buildings which, as they ultimately would be demolished, inevitably had to lose their value. Accordingly, an investment strategy should be "...for the most successful investor putting his money in land let on building leases" (Bowie, 1982, p.405). According to this view, buildings are irrelevant to long-term capital growth - only land value exhibits real increases in value. Yet, this model seems to require additional consideration: while this is attractive when considered over very long periods of time there appear to be examples where buildings do experience increases in real value over specific time intervals. The possibility exists that the way in which the stock of buildings in an area is collectively perceived, can add or remove value from them. One might point to the 1990s demand for 19th century warehouses for conversion to flats, something about which

Cowan (1965, p.1401) speculated. A fashion for living in industrial lofts developed, and the market gave increased value to the buildings in their potential new use.

(vi) Buildings tend to be complex bundles of attributes. Arias (1993, p.173) defined them as "...physical (design) to non-physical (economic or social), simple (house) to complex (housing systems), and include various levels of spatial and temporal aggregations." Many buildings contain a high subjective component relative to industrial equipment, but buildings share this with many consumer goods such as motor cars, furniture and clothing. Objective measures may be subordinate to subjective measures, such as an individual or collective 'attachment' to a building or place.

Flexibility is often held to be the major design-controllable determinant of their longevity, possibly as a result of the place-fixed nature of buildings. Other assets can adapt by moving to new locations: most buildings cannot. Brand (1994) used adaptability as a central theme. He wondered why 'ordinary' buildings have not been studied more, and proposed that designers should give additional consideration to alternative long-term 'scenarios' (p.31). Baum (1991, p.161), in developing a formula to model rent depreciation in City of London office buildings, included an explicit variable for flexibility, and suggested sub-factors for "floor layout, floor-to-ceiling height, services, internal finishes and fittings, entrance hall, external appearance and building deterioration." For each he posed questions, and proposed different weightings for such variables. Baum cautioned about using his model too mechanically, that past market behaviour may not persist into the future and that "Relative rates of depreciation for high and low flexibility buildings will presumably be different in other markets,..." (Baum, 1991, p.163).

(e) Social and Fashion Background

Written comment shows that people in different eras judge buildings in varying ways. Not only do they assess attributes differently, but put different weightings upon their importance. In this way, property ageing is more than merely dealing with the economics of the functional attributes of land and buildings. A strong element of subjective evaluation of design is present, and affects both sides of the retain/replace calculation.

Consideration of older sources illustrates the changing nature of subjective evaluation. In *The Stones of* Venice (1853) Ruskin promoted a positive reinterpretation of gothic architecture, with the object that surviving gothic treasures, notably those of Venice, would not be rebuilt according to the beliefs of people who saw them in terms of "unmitigated contempt", as a symbol of all that was undesirably "rude and wild", in contrast to the widely desired refinement of classical Roman civilisation (Ruskin, 1985, p.79). He proposed that 'Gothicness' of architecture, could be described in terms of six characteristics: Savageness (rudeness), Changefulness (love of change), Naturalism

(love of nature), Grotesqueness (disturbed imagination), Rigidity (obstinacy), and Redundance (generosity). Ruskin offered lengthy explanations of the nature of, and reasons for, these factors. Yet, many late twentieth-century viewers, notwithstanding the current gothic re-revival, would probably fail to see gothic buildings as either 'savage' or 'grotesque', even given Ruskin's definitions of these words, and might not attribute any importance to those particular variables.

A change in the way in which gothic was viewed did follow Ruskin, and was manifested in what the later Victorians chose to build. Yet often, even during their own times, Victorian interpretations of historical styles were questioned. 'Building' of 3 December, 1848 (anonymous) lamented:

> "Can it, oh, can it be a fact that every age of building finds at last some corresponding period of admiration, and will it ever be the lot of some degraded generation to cherish a cult of to-day's abominations?
>
> Will there some day be talk among the as yet unborn of the good old days of our great-grandfathers and their cathedral-tinted door panels, their winsome stop-chamfers, and their charming bay windows?
>
> Such a day I hope can never come."

However, fashion changes. The fabric of society was rendered asunder by the First World War, and it seemed most reasonable for people to look for causes of the death of a substantial portion of a generation, and reflect on their own survival. So social revolution was contemplated, dress lengths decreased, and architecture was reconsidered in terms of a new 'rational' man.

In much of historical architectural literature, empirical study of the nature of 'rational man' or of 'the workers' relative to buildings appears to be missing. Sources as varied as Ruskin, Mumford (1938), le Corbusier (1987), and Hilberseimer (1955) created rhetorical models of the inhabitants of new buildings and cities, undertaking little or no empirical exploration of their minds, needs, or aspirations. When considering these writings, one must remember that the notion of a consumer marketing focus in a business context, with accompanying research techniques, was not developed until the 1950s and 1960s (Assael, 1998, pp.8-9). It is possible that until recently most of the population regarded housing as a commodity. This issue is particularly apparent in the work conducted in conjunction with the University of Liverpool and the Building Research Station, published in 1955 by Dennis Chapman as *The Home and Social Status.* The initial parts of this book considered the complexities of furniture and window treatments by different socio-economic groups, and openly acknowledged the different roles of functional and non-functional aspects of the choices. When the book turns to housing, only the ‘functional’ attributes are considered: such as the state of the rendering, the level of infestation, and the nature of the plumbing and electrical systems. Hole and Attenburrow (1966) criticised ‘user studies’ undertaken by the Sociological Research Station of the Ministry of Housing and Local Government. Although the studies noted what they termed ‘fashion’ and ‘social status’ matters relative to window treatments and furniture choice, the buildings

themselves were still dealt with only in terms of area and other functional attributes. In particular, Hole and Attenburrow noted that low socio-economic subjects tended to judge buildings and furnishings differently. They found that although housing could be judged negatively, "...when it caused inconvenience, or did not fit the family's way of living, ... [it] was not assessed in terms of some positive set of criteria such as the tenants used when evaluating furnishing schemes" (Hole and Attenburrow, 1966, p.35). Yet, in retrospect, we can see that matters of 'fashion' and 'social status' did appear to have some impact. Victorian cities came to be despised, and were subjected to urban clearance efforts, until a new middle class, who would not consider themselves as 'workers', came to value 'workers' housing. More recently, modernist 'workers housing' has often been dealt with by its occupants through acts of vandalism (Dalrymple, 1995).

Brett (1947) believed that cyclicality could explain such acts of the marketplace, and was to an extent predictable. In *The Things We See: Houses* (1947), he left an empty frame for a yet-unknown form of housing noted; "Neo-Victorian, does not exist but no doubt soon will" (p.21). As predicted, Victorian houses came to be esteemed, their authenticity protected, and reproduction Victorian has become commonplace.

However, in a market which is unconstrained relative to the creation of new stock, it is easy to see how filtering-down can become, through the ongoing modification of consumer attitudes and preferences, a self-fulfilling prophesy. If a large portion of the critical consumer groups accept that as houses age, they become undesirable and suited only for housing low-income households, older houses and neighbourhoods are accorded reduced status. People with housing choice prefer to live elsewhere, thereby further undermining the value of the older stock.

2.4.4 Summary

Consideration of classifications of the determinants of building life-cycles indicates the intertwined nature of many of the factors. In particular, it can be argued that a key element of all factors has as its motivating force market beliefs about building value, and that, ultimately, value is an ephemeral concept. Even physical deterioration can result from a belief that the building is undesirable. If, as recent observation of the urban environment suggests, the building life-cycle is not a one-way journey to 'obsolescence' and eventual demolition, exploration of changing consumer belief structures should give insights into housing life-cycles.

2.5 EVIDENCE OF CHANGES IN HOUSING LIFE PROCESSES / NEED FOR NEW THEORY

A review of statistical information suggests that there have been changes in building life-cycles relative to housing. It now seems untenable to believe that single family dwellings have a chronologically determined life-expectancy. Accordingly, theory must be expanded to account for more recent processes. Such theory should include elements which will help predict future events, and give direction to managers, planners, and designers.

2.5.1 Past Theory

Until the 1970s belief structure about building life-processes frequently appears in the literature. The assumption of chronological ageing processes can still be noted in more recent studies, in particular those conducted in the United States, such as Shilling et al (1991), which used building age to proxy depreciation. Sources as recent as Goodman and Thibodeau (1995) attempted to model age-dependent price declines. Simplifying the arguments offered by the various key proponents, their following assumptions might be:

(i) Building life, for most of the stock, was largely a progressive time-dependent function, whatever the underlying causes might be. Indeed, much historical research, as summarised in Malpezzi et al (1987), did find that as they aged, buildings commanded reduced prices in the marketplace.

(ii) Ageing for most buildings and urban areas was seen as an irreversible, one-way decline into obsolescence: buildings and other urban structures aged, and then had to be demolished and replaced. Rehabilitation or natural regeneration might act to slow the rate of decline.

(iii) Ever-advancing consumer expectations would cause the older stock to become undesirable; people searching for enhanced amenity would always demand new buildings (Lowry, 1960, p.365).

(iv) Technological change would cause buildings to have ever-shorter service lives. Buildings would become outdated because they did not contain, or could not accommodate, emerging technologies. More rapid technological change implied shorter building life.

(v) Physical deterioration plays a minor role in building ageing. This has been long recognised in the literature.

The various authors who expound variants of this belief structure, did not have the benefit of recent observations and data. Now, there is evidence to support the proposition that, in the U.K.. in the recent past, housing life-cycles have changed substantially, which requires that the field be considered further, in order to develop more comprehensive theory.

2.5.2. Evidence of Change in Ageing Patterns

The prime weakness of many previous studies of building ageing is that they assume that building life-cycles would not change dramatically over time. Yet there is widespread evidence that housing ageing processes do change. This includes:

(i) The almost total cessation of demolition in the older housing stock in Great Britain and in the United States;
(ii) The rehabilitation of areas of older housing which previously would have been seen as candidates for slum-clearance;
(iii) The appearance of reproduction houses as a popular form, including as a product of larger housing developers;
(iv) Increasing pressure for enhanced conservation measures, including the designation of areas of old but quite ordinary houses as conservation areas;
(v) A change in social perspective: less widespread concern about sub-standard housing.

2.5.3. Reduction in Level of Demolitions

A review of various statistics shows that there has been significant change in the manner in which U.K. society treats its buildings. The housing stock is clearly remaining in service for increasing lengths of time.

Historic data on the age of the housing stock is limited. J.C. France (1959) assembled data on the age of the housing stock at that time, basing it on construction and demolition rates. He lamented "Information on the age of dwellings is far from precise. Statistics of housing building before the First World War are not too reliable,..." (France, 1959, p.224). The census did not collect dwelling age data before 1971.

Much of the twentieth century was characterised by substantial housing demolition; between 1964 and 1972 over 0.6 per cent of the housing stock of Great Britain was demolished each year. Since the early 1970s there has been an ongoing decline in demolition rates, dropping in the 1990s to a tenth of the rate of the 1960s. At this rate of demolition, it would take over fifteen hundred years to completely recycle the current housing stock.

The high level of demolitions and then the virtual cessation are shown both in absolute numbers and as a percentage of the housing stock in Exhibits 2.4 and 2.5 respectively.

Exhibit 2.4: Annual Housing Demolitions, Great Britain.

Source: *Housing and Construction Statistics* (various years), Department of the Environment, HMSO

Exhibit 2.4: Annual Housing Demolitions, Great Britain.

Source: *Housing and Construction Statistics* (various years), Department of the Environment, HMSO

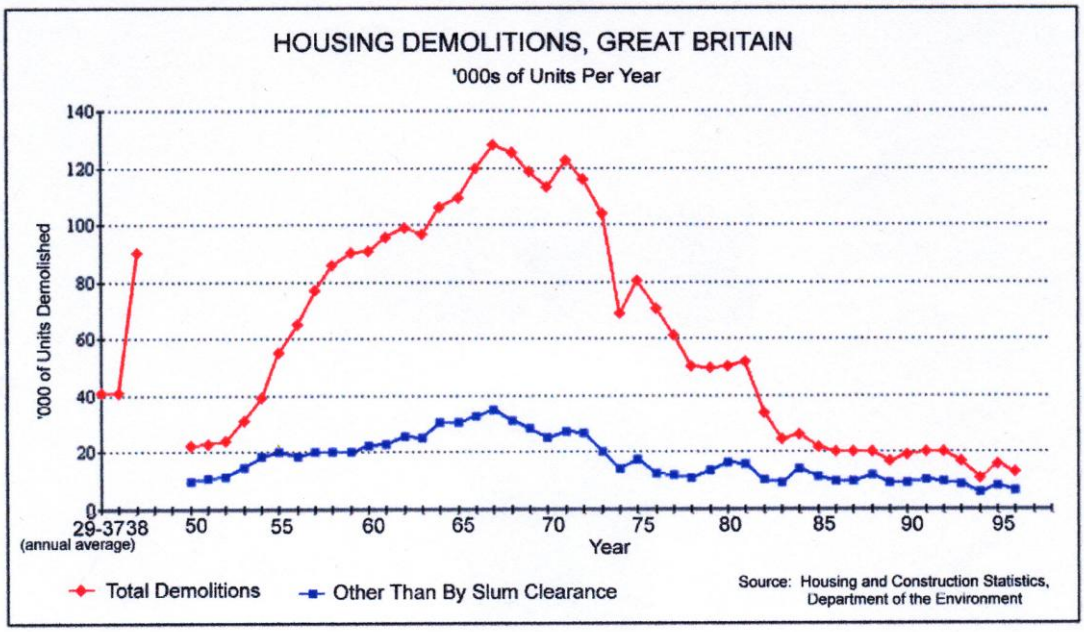
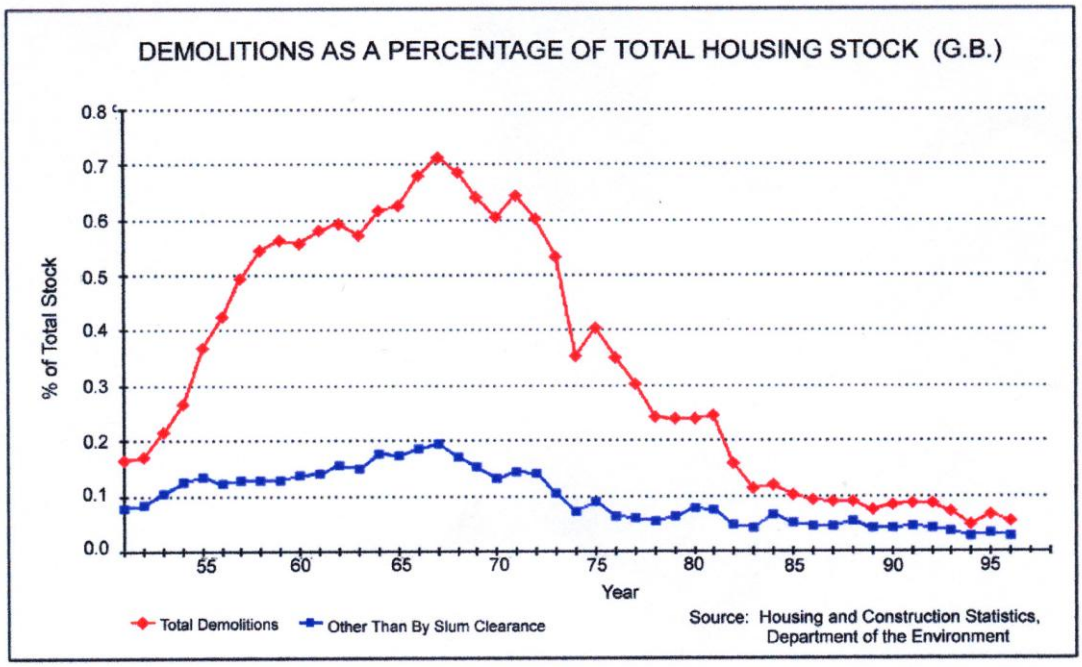


Exhibit 2.5: Housing demolitions as a percentage of total housing stock, Great Britain



2.5.4 An Increasingly Old Housing Stock

In order to understand the composition of the housing stock, data was assembled from the Department of the Environment Annual Abstracts of Statistics for housing age composition between

1971 and 1996. J.C.France's (1959) estimates were used for 1959, although some caution must be exercised in comparing these with the later data, due to difference in methodologies. Of course, in 1918 the entire stock dated from before 1918.

Exhibit 2.6 shows the percentage of the housing stock over fifty years old and over one hundred years old in various years since the 1971 census, together with France's estimates for 1959.

Exhibit 2.6: Percentage of the housing stock over 50 and 100 years old (England)
Sources: U.K. Abstract of Statistics, Department of the Environment, 1959 data: J.C. France (1959)

AGE OF HOUSING STOCK (ENGLAND)

	Percentage over 50 years old	100 years old
1959	42.6	16.9
1971	37.1	9.3
1976	38.0	10.3
1986	41.8	13.2
1996	45.8	15.2

This housing age data is depicted graphically in Exhibits 2.7. Exhibit 2.8 shows how this translates into building age profiles for various years.

Exhibit 2.7: Housing stock by date of construction (England)

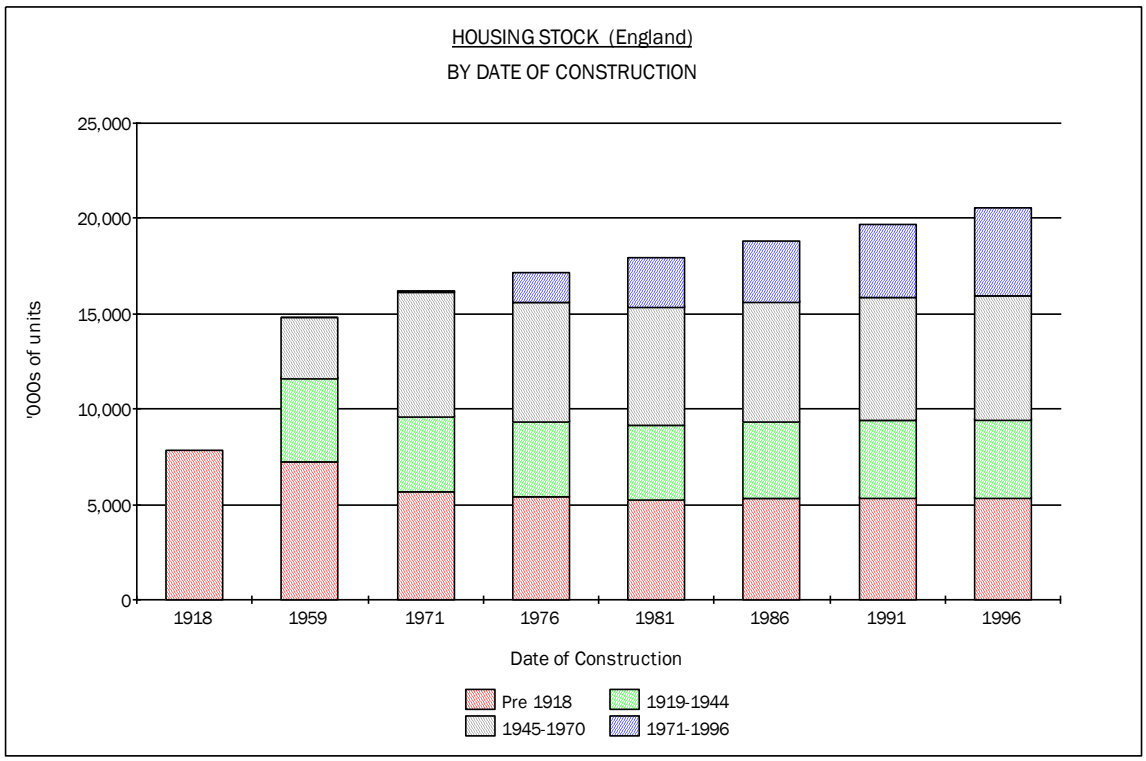
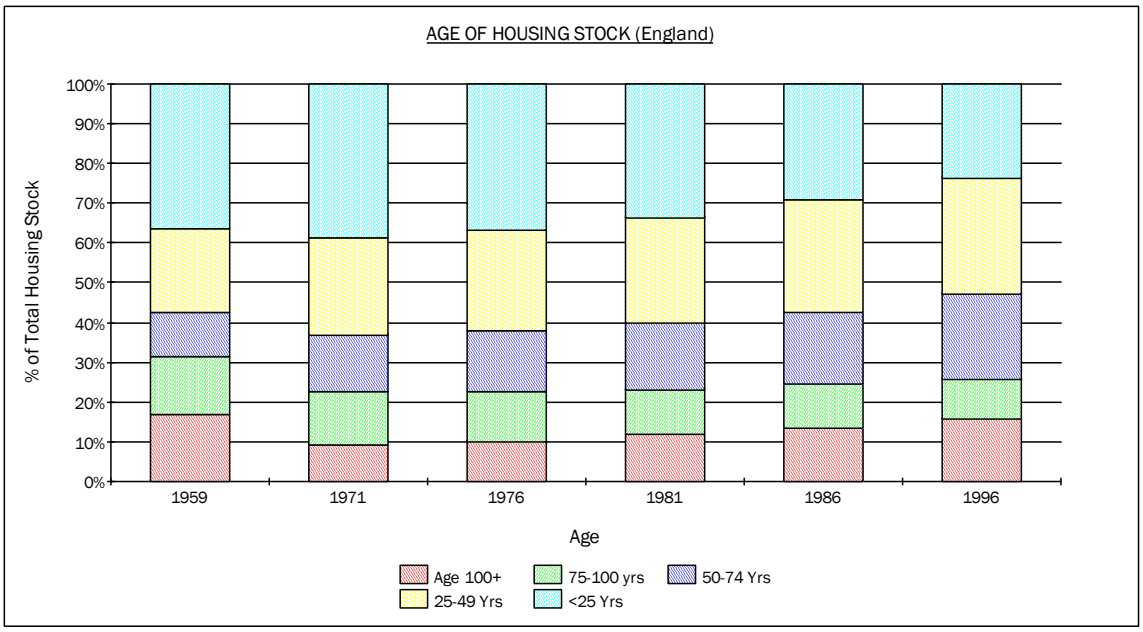


Exhibit 2.8: Age composition of the housing stock 1959-1996 (England)



The data indicates the considerable success of the massive urban redevelopment programmes of the 1960s in removing old stock and replacing it with new, with approximately 32 per cent of the pre-1918 housing stock having been demolished. However, since 1971, the stock has been advancing in age. According to the older sources referenced, which were concerned with the causes of 'blight', a housing stock of advancing age should represent a problem. However, visible evidence suggests that this is not the case. Older houses are now maintained, refurbished, extended, and even legislatively protected.

2.5.5. U.S. Housing

As with the United Kingdom, historical statistics on the age of the housing stock in the United States are limited. However, similar patterns can be noted (Exhibits 2.9 and 2.10). After large quantities of the pre-1940 stock were demolished between 1960 and 1980, little is now being removed. Most recently, the main decrease has involved units created between 1960 and 1969 (Exhibit 2.10). This presumably represents the removal of ageing public housing.

Exhibit 2.9: U.S. housing stock by date of construction
Source: 'Statistical Abstracts of the United States', U.S. Department of Commerce, Various years.

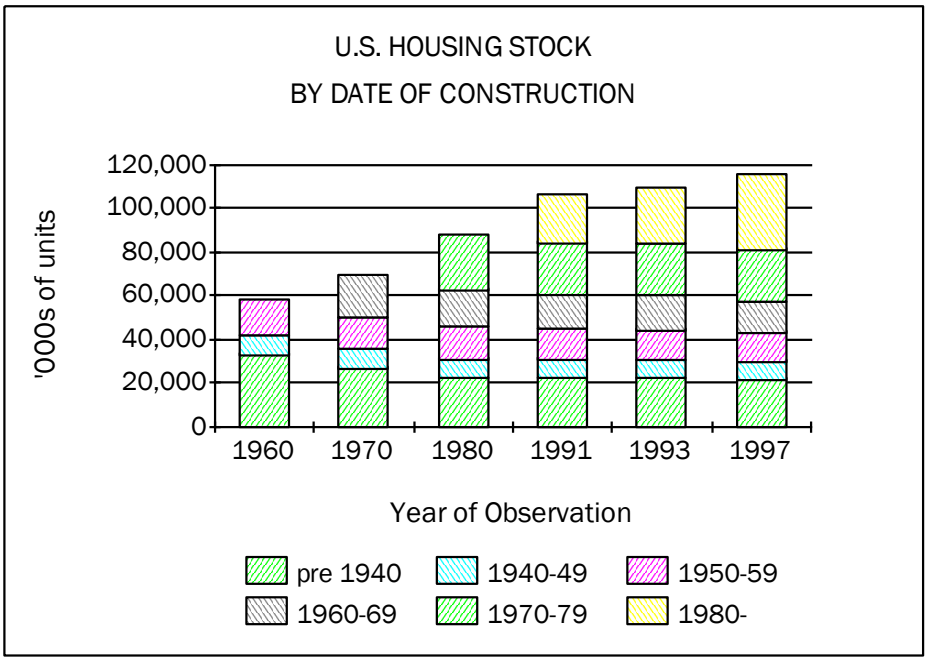
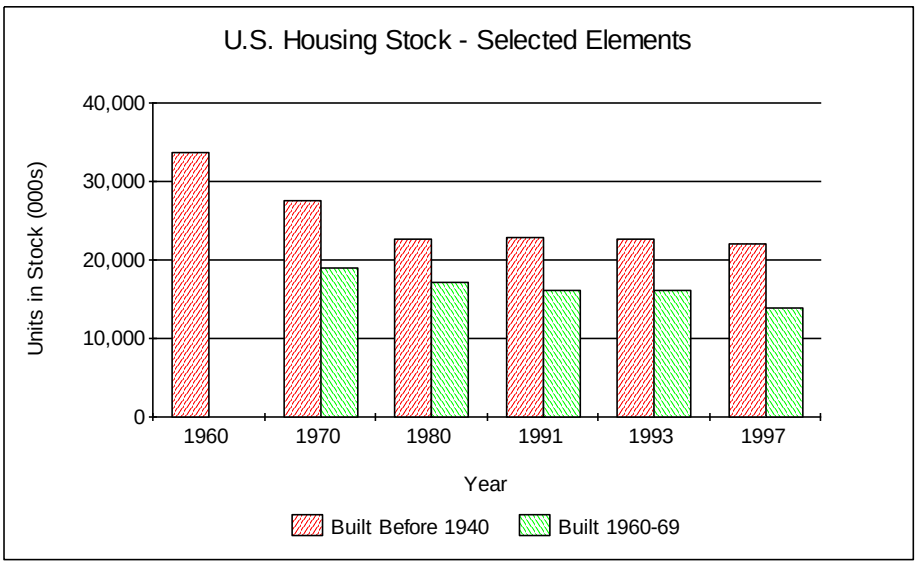
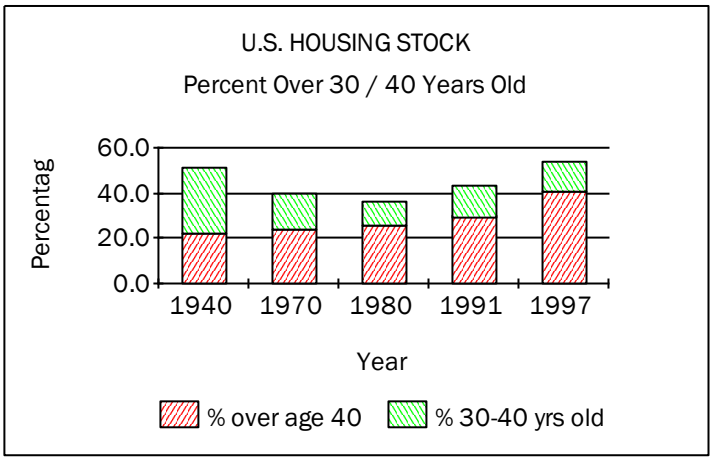


Exhibit 2.10: U.S. housing stock: Number of units in stock built pre-1940 and 1960-69



If the percentage of dwellings in the U.S. housing stock over 30 and 40 years of age is calculated, an increase in the relative numbers of the older stock is evident, similar to that seen in the U.K. From a level of 24 per cent in 1970, dwellings aged over 40 years old increased to 41 per cent of the total stock by 1997 (Exhibit 2.11).

Exhibit 2.11: U.S. housing stock, Percent over 30/40 years old, 1940 to 1997

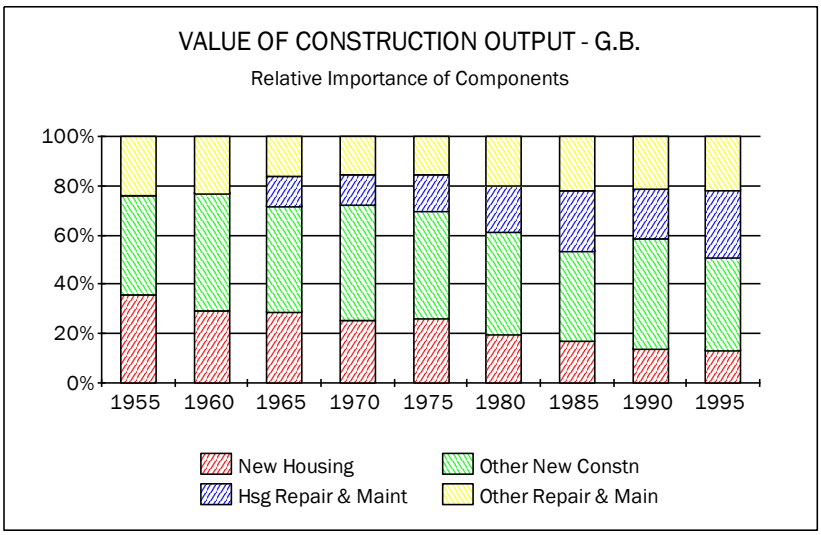


2.5.6. Economic Statistics

Economic statistics show a shift in building-related expenditures away from new construction. In the mid 1970s, the amounts attributable to repairs and maintenance of the building stock, including housing, began to rise, so as to surpass that spent in new construction. The nature of the non-residential building stock is less well reported than that of housing, however national economic statistics reveal, on an ongoing basis, a decreasing importance of new construction and a relative increase in renovation activity.

Exhibit 2.12 shows the division of construction output between housing and non-housing and new construction and repair and maintenance. In the U.K. between 1960 and 1995, repair and maintenance increased from 23 percent to 49 percent of total national construction output. This increase would be expected in the presence of increasing numbers of physically old buildings in the country, but also suggests a societal willingness to maintain them.

Exhibit 2.12: Value of construction output: Relative value of components, 1955-1995, Great Britain
Source: 'Annual Abstract of Statistics', Central Statistical Office, HMSO, - various years

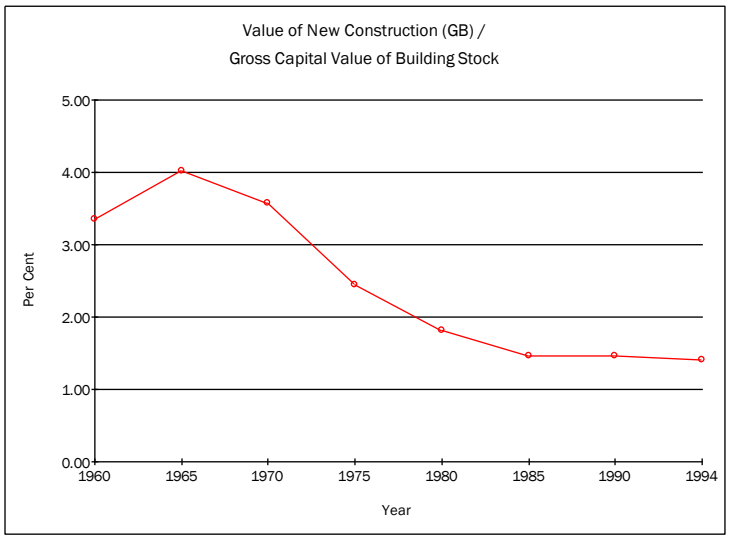


('Other Repair and Maintenance' includes both housing and 'other' before 1965)

By 1985,the ratio of the value of new construction to the gross capital value of the national building stock had fallen to less than half of its 1970 level, and has remained nearly constant since then, with approximately 1.25 percent being added per year to the gross capital value of the building stock (Exhibit 2.13).

Exhibit 2.13: Ratio of the value of new construction to the gross capital value of the building stock, Great Britain

Source: 'Annual Abstract of Statistics', Central Statistical Office, HMSO, - various years



Specific housing statistics also show the changes with clarity. Exhibit 2.14 shows that expenditures on the repair and maintenance of housing in 1965 were less than half of new construction: by 1995 they were more than double.

Exhibit 2.14: Output by contractors for housing, Great Britain

Source, DETR Housing and Construction Statistics

2.5.7. Conclusion

Statistical data demonstrates that numbers of changes in the housing life-cycle have occurred since 1970. It is evident that demolition of older houses has essentially ceased in both the U.K. and the U.S. U.K. statistics point to ongoing increases in renovation and maintenance expenditures, which suggests that the stock is being maintained and modified to meet emerging consumer requirements, rather than being replaced. While some of this activity resulted from government housing-rehabilitation programmes instituted in the late 1960s, there appears to be a societal consensus about maintaining and improving houses. Accordingly, if no change in consumer attitude occurs, the widespread deterioration and obsolescence observed in the first part of the twentieth century is unlikely to recur.

A model which suggests that building value invariably decreases over time, has the corollary that either demolition is inevitable, as the value falls below the liquidation value of the land, or that the land value falls too, with the neighbourhood eventually entering an 'end-state' twilight, which necessitates government action, such as slum clearance. Inspection of many cities in the East of England suggest that this is not a universal phenomenon, so some other factor than simple chronological ageing is at work. Accordingly, investigation of the process is appropriate.

2.6 REASONS FOR A CHANGE IN THE LIFE-CYCLE OF HOUSES

A number of possible explanations exist for an increased longevity of houses. Similarly, there are a number of feasible fundamental explanations why an attitude of 'if it is old it must be bad' would develop, and then disappear.

2.6.1. Impact of the Planning System and other government regulation: Preventing Poor Quality / Short-Life Housing and Environments From Being Created

Through most of the twentieth century, an 'old' house was likely to be an inferior house - not solely due to deterioration, but because it was originally poorly constructed. The gradual appearance of regulations governing the creation of houses and neighbourhoods through the 19th century, meant that newer houses were, in general, better houses. Much early Victorian housing, built during massive urbanisation, was deficient, and was seen by Victorian reformers as a major health hazard (Thompson, 1988, p182-183). Williams (1987, p.187) graphically portrayed this: "The stench and filth of an early nineteenth century town is hard to imagine today. Human excreta was literally everywhere - on floors and walls, in cupboards. Those living in cellars frequently had to tolerate walls oozing with 'filth' as it seeped through from other dwellings and open troughs which might carry human waste from the upper floors of the house in which they lived." In an attempt to ensure that houses met some level of 'fitness', Victorian governments addressed the most significant and obvious problems first. Burnett (1986, p.335) discussed how the Victorian regulations were focussed on an attempt to create 'sanitary' houses; the intent of the various pieces of legislation being underlined by their health-orientated titles.

A major effect of the development of regulations was that the cheapest elements of the housing market had to built to higher standards. Medhurst and Lewis (1969, p.5) attributed the improvement in housing construction to the emerging regulations. Burnett (1986, p.161) noted how various pieces of legislation affected house construction: "Sounder constructional methods and materials meant better insulation from cold, damp and noise; higher ceilings (usually a minimum of 8ft 6in) and larger windows gave greater light and ventilation, especially in bedrooms; timber flooring increasingly replaced stone flags; staircases became less steep and tortuous; and there was better provision of fireplaces, sinks, coppers and iron cooking-ranges which usually combined an oven and water-heater."

This procession of legislation relating to housing conditions, through the 19th century, included:

- Public Health Act, 1848: Created a framework whereby local boards could be created and could ensure that new and existing houses were provided with water and drainage.
- Nuisance Removal and Disease Prevention Act, 1848.
- Nuisance Removal Act, 1855: This empowered justices to order that certain basic amenities be provided to make existing houses habitable.

- Sanitary Act, 1866: This focussed on the provision of connections to sewers or other appropriate waste systems.
- Artizans and Labourers' Dwellings Act, 1868.
- Artizans and Labourers' Dwellings Improvement Acts, 1875 and 1879.
- Public Health Act, 1875: This was a major consolidation of previous legislation, empowering local authorities to develop building bye-laws for, *inter alia*, sanitation, lighting, ventilation, and structural matters. Some of these were 'planning' measures, providing for the creation and enforcement of bye-laws "regulating the size of rooms, the space about the houses, and the width of the street in front of them,..." (Telling and Duxbury, 1993, p.3). This act led to the 'bye-law house', acres of which are still found in many cities. It largely ended the construction of back-to-back and courtyard housing, which had tended to rapidly degenerate, although McKie (1969, p.20-21) noted "...the 1875 bye-laws were adopted in Leeds in 1876 but in 1883 back-to-back dwellings were still being built..."

Burnett (1986, p.28) noted that some historic pieces of legislation which undermined house quality were eliminated in the mid-nineteenth century. Excise taxes on glass, and window taxes were a deterrent to adequate lighting in houses. Similarly, an excise tax on bricks encouraged construction of flimsy dwellings.

While the Victorians did not develop a comprehensive planning system, legislation came to control the development of urban environments. These included the noted public health acts, and later The Housing and Town Planning Acts of 1909 and 1919 and the Town and Country Planning Act, 1932. Previously, neighbourhoods could undergo substantial change in status (Thompson, 1988, p.171), however in the twentieth century development control created enhanced neighbourhood stability.

While it is not the point of this paper to detail the legislation, by the time of the First World War, an individual could occupy a new house in England with reasonable assurance that not only was it possessed of reasonable standards, but dramatic and sudden change to the neighbourhood, except by government action (friendly or hostile), was unlikely.

Similar changes occurred in the United States, although somewhat later. Daunton (1990, p.254) noted regulations of the early twentieth century to prevent the worst forms of development. Ratcliff (1949, p.329) commented: "The fact is that a good deal of our present housing stock was built at or not much above the slum level. Much of the housing now in violation of local codes is illegal not because of progressive deterioration but because of original design and lack of minimum equipment." Notwithstanding building regulations, he pointed out that the creation of this inferior stock was then quite recent: "A special tabulation of data from the 1940 housing census reveals that a surprisingly large proportion of the new single-family dwellings built between 1935 and 1940 were low-value shacks" (Ratcliff, 1949, p.330).

2.6.2. The Elimination of the Worst of the Housing Stock

The housing stock became better as regulations came into place during the 19th century, so, as might be expected, slum clearance and natural attrition implied the removal of the worst elements of the stock, which corresponded to the oldest houses. The slum clearers and researchers, up until the mid 1970s, were still facing cities which retained significant numbers of crudely built old houses. Cullingworth (1979, p.86) noted that the downturn in slum clearance in the early 1970s corresponded with the time at which a large proportion of the worst housing had been removed.

Taylor (1973, p.153) argued that clearances, and later renewal, operated generally on the date of construction: "In historical terms this meant that, even after the worst pre-byelaw or 'early byelaw' streets of the 1850s and 1860s had been redeveloped, there was still a mass of standard byelaw houses of the 1880s and 1890s, basically decent as family homes, which urgently needed to be brought up-to-date in plumbing and damp-proofing if they were to avoid decay and demolition. It was to save these that the Labour Government acted wisely in introducing, through the 1969 Housing Act, a set of major new powers for local authorities to designate General Improvement Areas,..." Many of the oldest houses had been cleared, so were no longer a major problem: late Victorian houses could be refurbished.

There is ongoing evidence of a correlation between housing demolition and the appearance of legislation. Data developed from the Housing and Construction Statistics (Department of the Environment) showed that between 1991 and 1996, demolition still occurred at different rates in different parts of the stock, showing rates of approximately 0.21% per year within the pre-1871 stock, 0.11% for the 1871-1891 stock, with no net demolition in the 1891-1919 stock. Even now, demolition, although greatly reduced, still takes place at the highest levels among the houses built prior to significant building and planning regulations.

It is possible that the clearance programmes contributed to the deterioration of marginal housing stock, as suggested by Medhurst and Lewis (1969, p.113-114), who argued that an area perceived to be under threat of compulsory purchase and clearance would receive little maintenance or capital investment. The owner of a house deemed unfit and slum cleared, could not be assured of receiving more than nominal compensation prior to 1969 (English et al, 1976, p.60-61). Successive governments set time frames for the total elimination of substandard housing, and aggressively pursued such a course of action, only to face ever-increasing amounts of deteriorating housing. If the next street had been demolished, why would you maintain your house?

From a viewpoint in the 1960s, slum-clearance programmes would have seemed to address the oldest houses first. The public could not be expected to know that this was not a result of

chronological obsolescence and deterioration, but, to a large extent, reflected the original quality of early industrial revolution housing.

2.6.3. Increased Owner-Occupation

Increasing owner-occupation of housing also had a number of effects. One is an association between owner-occupation and standards of building maintenance and improvement, as argued by English et al (1979, p.180), although there is not uniform agreement. Thomas (1986, p.8) argued that owner-occupation caused "underinvestment and decay". Parker and Mirrlees (1988) noted that building society lending through much of the twentieth century was focussed on new owner-occupied houses, in part because the rent controls imposed in 1919, which also made removal of sitting tenants difficult, tended to keep older stock in private rental and poorly maintained. Nutt et al (1976, p.15-18) agreed that in an environment of rent control, high demand, and insufficient new supply, there was limited incentive for improvement of the rental stock, or more than a minimum level of maintenance. In the post Second War period, building societies were encouraged to lend on older houses, enabling them to be transferred into owner-occupation, in which improvements could be undertaken. Between 1951 and 1971, immediately before the period in which the suggested attitude shift occurred, there was a dramatic rise in owner-occupation, including within the older stock. With rising home-ownership levels, government programs could be created to assist in the rehabilitation of older housing; in previous eras when a large share of the private stock was rented such assistance would be seen to be benefiting private landlords (Cullingworth, 1979, p.74). Parker and Mirrlees' (1988, p.370-371) compilation of estimates shows the high level of unfitness in the private rental stock when compared with other forms of tenure (Exhibit 2.15). Again, a spectator might believe that generally older houses (rental) were poorer than newer houses (council or owner-occupied), and would not be aware of the importance of tenure in establishing standards of maintenance.

Exhibit 2.15: Stock of dwellings by tenure and condition, England and Wales

Estimates from Parker and Mirrlees (1988, p.371-371)
Compiled from Various statistical sources

			Percent Unfit		
	Owner Occupied	Private Rental % of Total Stock 'Other Tenures'	Owner-Occupied	Local Authority / New Town	Private Rental & 'Other'
1914	10.0				
1938	32.4	57.8	-	-	-
1951	31.0	52.0			
1967	50.8	21.4	7.0	1.7	33.2
1971	53.0	16.5	3.7	1.2	22.9
1976	55.2	15.8	3.1	1.0	18.2
1981	57.0	11.6	5.0	1.3	18.1
1991	66.3				
1997	67.2				

2.6.4. Impact of the Planning System and Other Government Regulation:

It can be argued that the low level of home-ownership among the Victorians was, in part, a reasonable response to their rudimentary planning system. In an environment of urban instability, where future house values could be badly compromised either by technical innovation or by changes in the community, renting was a viable option. Presumably once there were large numbers of home-owners in an area, there would be a rising expectation that the planning system would create the stability so as to guarantee the future value of their homes.

Government regulation can have an impact on the supply and pricing of new housing. Cheshire and Sheppard (1988, p.471) stated, "If development control effectively restricts the supply of new residential development then it raises the prices of houses." This would likely have the effect of increasing the differential between the value of existing uses and buildings relative to redevelopment alternatives. Abouchar (1983, p.9) noted the same effect for railway equipment: "that locomotives, thought to be wearing out in ten years, are maintained into the twentieth [year] if costs for new locomotives rise sharply." Similarly, increased regulation which makes developing land more difficult or time consuming, will tend to constrain new supply, likely raising the values of existing houses.

2.6.5. Technological Obsolescence

Technological obsolescence in the earlier literature was proposed as a reason why buildings would be replaced (Salway, 1986, p.51). Rising standards would inevitably force older buildings to be discarded. This force is still present, for example larger and longer lorries have put pressure on urban industrial buildings. Yet, in the housing stock, instances in which technological change has forced replacement are not obvious. Much pre-First War housing has come to accept central heating, indoor toilets and baths, electrical lighting, telephones, refrigerators, modern kitchens, and computers relatively easily, and at lower cost than complete replacement of the dwelling. Factors which were once seen to be indicators of unfitness and motivators for demolition and redevelopment, such as deficient kitchens and toilet facilities, as enumerated in various *English House Condition Surveys*, have turned out to be only minor issues in rehabilitating housing.

2.6.6 Concern about the products and initiatives of the 1950s and 1960s

The promise of urban redevelopment and modern buildings in the 1950s and 1960s did not seem to be fulfilled. Switzer (1970, p.1) said "the central area redevelopment of Worcester is now generally referred to as 'the sack of Worcester'" and more generally, "...what has appeared... is of such shoddy materials and so generally mediocre that the new centres are infinitely depressing." Escher (1981, p.80) agreed that there was a widespread belief in the poor quality of post-war buildings: “In the first place, post-war buildings began to come to pieces: they blew up, collapsed, leaked, burnt out, had

their roofs blown off. The spacious new houses and flats that people could not afford to heat suffered appallingly from condensation. In the high flats, the lifts failed and there was no one on hand to repair them: in the sealed office blocks the air-conditioning failed or the external cladding fell off." Dalrymple (1995) saw "the materialist and rationalist conception of human life" as having led to housing forms which only satisfied "a few simple physical needs", and ignored the complexity of humanity. If professionally planned and managed communities and buildings did not fulfil expectations, other forms were possibly worth more.

2.6.7 Appearance of Examples of Successful Regeneration of Building Stock

Medhurst and Lewis (1960, p.60) pointed to the impact that the cataclysmic events of the twentieth century have had on housing ageing: "...at a time when the buildings erected between 1850 and 1900 were beginning to need substantial attention or replacement, the war and its aftermath prevented us from facing up to the task." Accordingly, for much of the twentieth century people were faced with neighbourhoods of poorly maintained buildings: there were few examples of successful refurbishment, and some saw it as only undertaken by very specific, perhaps eccentric, parts of the population, as implied by Thompson (1979) and Clark and Rivin (1977). Government initiatives were required to promote regeneration, as were implemented in the 1969 framework for General Improvement Areas. Rattray (1990) pointed out how, in Glasgow, once people had seen that older housing could be refurbished "There was no going back" (pg.30). Now, people are familiar with the concept, having many examples of transformed neighbourhoods, and it is often taken for granted that even the most unlikely urban neighbourhoods in Britain can regenerate (Ore, 2001). Putting money into refurbishment or maintenance of an older house now would appear to be a reasonable investment.

2.6.8. Fundamental Change in the Marketplace: Economic and Urban Stability / Increasing Affluence

The period from the Napoleonic Wars to the 1960s was one of major turmoil and change for most of the developed world. The industrial revolution was characterised by massive population growth[3] and urban change, and the first half of the twentieth century by war and intervening economic uncertainty. In contrast, the last third of the twentieth century offered comparative stability and affluence for most consumers. As a result of this stability some of the factors which caused

[3] England & Wales Population: From *Mitchell (1962). Abstract of British Historical Statistics*.

Year	Population 000s	Average Annual Increase
1801:	8,893	
1821:	12,000	1.75%
1841:	15,914	1.63%
1861:	20,066	1.30%
1881:	25,974	1.47%
1901:	32,528	1.26%
1921:	37,887	0.82%
1951:	43,758	0.52%

buildings to change have diminished. Brand (1994), in his time series photographs, showed the progression of buildings on certain American streets over various decades of the nineteenth and twentieth centuries: yet these were periods which saw major economic, political, technological, and social change. It might be suggested that some of the factors which drove the replacement of these buildings, are not universal or constant.

Assael (1998, p.9) explained why consumer behaviour changed in a fundamental manner, through the Postwar period: "During the Depression, there was little purchasing power to spur an interest in consumer behavior. During World War II and immediately after, scarcities were prevalent. There was no competitive pressure to discover consumers' motives or to adjust product offerings to consumer needs." Accordingly, corporate strategies were based on creating economies of scale. Following the Korean War, industry found that for the first time in the modern western world a true 'buyers' market had appeared. A diversity of market segments appeared, and market research emerged, with a strong emphasis on understanding consumer behaviour. Industry has generally moved away from attempting to fill the basic needs of a mass-market, and now addresses cultures and sub-cultures of demography, lifestyle, and personality characteristics (Assael, 1998, p.25).

The change in attitudes towards housing and other products may be seen as part of a widespread change in social attitudes. Ainley (1993) saw the 1970s and 1980s as being a time in which many previous beliefs were discarded or modified, in particular, that "...the hopes held since the Enlightenment, that progress and increasing rational control over society and the economy were possible, if not eventually inevitable, have been abandoned" (p.2). He also noted that post-industrial society was characterised by "the ubiquity of advertising, which ransacks the costume cupboards of history to present a collage of styles designed to sell the latest information compressed into instant images" (Ainley, 1993, p.3). Beesley and Russwurm (1989, p.23) argued that the terms of reference for 'quality of life' changed: "The 1960s and early 1970s are an important period in the growth of interest in the quality of life concept... Part of the impetus for these developments came from arguments that economic growth and an emphasis on material well-being tended to increase the production of undesirable by-products (e.g. pollution, housing and social problems), and that the costs associated with these by-products were greater than the gains of economic growth. Thus the quality of life for many people actually declined." Some sources undertook to define a 'postmodern' culture. Marsden and Littler (1998, p.15) proposed that 'postmodern' consumers "...'proactively' assign meaning to and represent their environments rather than just passively responding to them", and supported various sources that people can change their self-concepts and maintain contradictory value systems, without feeling inconsistent (p.16). If current consumers follow this model, it is not surprising that the housing life-cycle has changed, as consumers increasingly define and select housing forms to align with their self-images.

It is possible that a belief in widespread demolition and reconstruction is associated with a particular level of social development, which has been passed in many parts of the developed world. Articles exploring destruction of traditional urban areas, have appeared, such as 'That was Beijing': "In the past few years, much of what remained to make China's capital an extraordinary city has been systematically destroyed in favour of characterless boulevards and brutalist, bathroom-tile-clad architecture,..." (The Economist, 2000, p.95-96). This article referenced the support of many of the residents, that old urban areas remind the population of an era of backwardness, and noted one Beijing consumer: "Stylish new furniture doesn't sit well in these old-fashioned buildings."

2.6.9 Summary

A variety of reasons indicate why, through most of the twentieth century, it was tenable to believe that the housing life cycle was one of creation, a decline into obsolescence and decay, followed by demolition and redevelopment. As neighbourhoods became more stable, as the oldest dwellings were slum cleared and newer dwelling built to better standards, and as houses were transferred to private ownership and improved, the apparent correlation between 'old' and 'undesirable' weakened. With pioneering examples of successful house refurbishment and area regeneration, it was clear that investment to improve and maintain older houses was a sound strategy. This life-cycle of houses is now apparently considerably more complex, involving decline, improvement, changes in status, as houses come to accommodate and reflect changes in society and technology.

A belief in progressive housing depreciation and obsolescence has apparently been supplanted by other forces, which drive house life-cycles. Insights into these forces may help to understand how the building stock will evolve in the future, and what strategies housing providers and regulators might follow.

2.7 THE ONGOING NEED FOR RESEARCH

2.7.1 Understanding The Consumer

The focus of this review of past research was to consider the forces behind housing life-cycles, and in particular the appearance and disappearance of the presumption that buildings would, and perhaps should, at some predictable point, be demolished. Unfortunately most research occurred when empirical evidence suggested that buildings eventually became 'obsolescent' and so were destined to be demolished. Accordingly, much work attempted to understand when the final demise might occur, often with the object of being able to facilitate redevelopment. The evidence presented shows that buildings do not necessarily age according to a chronologically predictable model but can undergo complex paths involving periods of decay, change of use, refurbishment, and institutional protection. This means that attempts to gain more insight into the way buildings are assigned value are in order.

Progress in other disciplines has made it possible to investigate consumer attitudes towards buildings. Psychology has created tools and theory, market research has applied them, and advancing computer programmes have enabled researchers to analyse large and complex data sets, in order to derive meaning. Unfortunately, the possibilities so created have not been enthusiastically embraced by planners and architects, perhaps because the idea that consumer opinion and responses can be measured may be perceived to inhibit design freedom. Cowburn (1967, p.398) suggested that rising consumerism could lead to a "reduction in the aesthetic leadership exercised by the architect".

There are a number of reasons why ongoing research should be valuable. Llewelyn-Davies in Cowan (1969, foreword), saw quantified work on building ageing processes as important in understanding cities: "The study of cities has been going on in one way or another for hundreds of years, but it is only recently that the development of new methods of research has enabled significant progress to be made in understanding the urban process." In particular, he saw "studies of the 'actors' in the urban scene" as an integral part of an improved understanding of urban evolution.

If there is now a societal expectation that buildings and urban environments will survive extended periods of time, it is appropriate that the likelihood of future change of consumer attitudes and preferences be recognised and accommodated in design. Bull (1993) used an analogy from the aircraft industry to describe the need for better understanding of building life-cycles; in the early part of the twentieth century, aircraft were frequently being replaced by new models: now aircraft can remain in service for decades. This changes design requirements. "A modern airframe has to be able to survive all the age-related depredations such as metal fatigue and corrosion that its predecessors never lasted long enough to encounter, while throughout its life it must remain capable

of carrying successive generations of avionic equipment, much of which has never been even imagined at the time of its design" (Bull, 1993, p.87). Improved insights into how buildings and cities move through time should lead to more effective management, planning, and design.

2.7.2. Past research Suggests Promising Initiatives

Much past research into the relationship between the consumer and the environment has roots in psychology, which tends to focus on the cognitive processes involved. Within an architectural and planning context, market research may be a better starting point than psychology, because of the need for clear applicability. While compromises are always necessary, a marketing emphasis should help to ensure that findings are valid and useful. A number of aspects are suggested for appropriate research.

(a) Cultural basis: Using appropriate, real consumers

The proliferation of material which deals with cross-cultural management (for example Trompenaars and Hampden-Turner (1993), and Walters (1997)) finds that people vary on the basis of culture and specific background. This means that work based on people who are not housing consumers may not be appropriate when considering consumer interaction with the housing stock. Studies undertaken by academics exploring human/environment interactions frequently use the most available source of compliant subjects - undergraduates.

Furthermore, much work has been done in the U.S. and uses, understandably, Americans and their building forms. The explorations contrasting, for example, 'colonial style' houses with 'craftsman' or 'Mediterranean-style' houses (Nasar, 1989) do not directly apply to the U.K. situation. It is easiest to describe many U.K. house forms relative to the era and local economic climate in which they were created. Many of the house types which respondents in each country would readily recognise as indigenous and familiar, would undoubtedly be perceived as unusual and foreign in the other. While some findings are transferable, others may be subject to specific attitudes and preferences in various cultural settings. Of course, this is contrary to much of twentieth-century architectural thought, that an 'international' form of architecture is possible and desirable.

(b) Time-Based Research

If the way houses are evaluated varies between cultures, it is likely that evaluations also vary over time. This is a difficult area to study, and previous work is limited. However, it is likely to be promising. Nasar (1994, p.395) offered the opinion that "Design review could benefit from further inquiry into long-term patterns" because it was not clear that what one generation preferred might be preferred by subsequent generations. There are some previous studies, with tantalising but hardly comprehensive findings. Rapoport (1990), through cross-cultural and longitudinal investigations of

public spaces, found that certain levels of complexity were associated with desirability over the long term. Stamps (1999, p.693) collected data about consumers and buildings over a period of 23 years, without finding a significant drift in preferences, however the study is location-specific and his observations may not span enough time to identify the relevant attitude and preference changes.

(c) Housing as a Subject of Study

It is possible to undertake investigations into many parts of the building stock, however housing was identified as being most suitable. Unlike most other types of building, housing is a direct consumer good, not an intermediary leading to some other form of consumption. For example, a shopping centre is used as an adjunct to the goods and services on offer within - so consumer responses relate to a bundle of shopping attributes, including the nature of the goods offered, the help provided by the shop assistants, and the ease of finding a parking space, as well as those specifically pertaining to the characteristics of the building.

Decisions about housing also tend to be made directly by the consumer; especially in the case of owner-occupied dwellings. This is in contrast to many other types of buildings about which decisions are made as part of a corporate function, in which organisational behaviour may be the dominant consideration. Canter (1974, p.8) pointed out that building creation is usually a group activity, which can be dominated by matters of 'organisational psychology'. Webster and Wind (1982, p.156) noted "...organisational (ie. industrial and institutional) buying usually involves many people in the decision process with complex interactions among people and among individual and organizational goals." This, combined with the indirect nature of consumption, means that office buildings, for example, can be very disconnected from consumer preferences - teams of managers procure and furnish them, and the ultimate users experience them as adjuncts to their employment. Organisational policies and political structures can dominate the decision-making, having their effect on the relative importance of goals, evaluation criteria, and decisions.

Housing is important to people in many ways, and people can act upon their preferences, so one might expect robust attitudes about different forms to have developed. Such opinion should be more identifiable and enduring than that about other forms of buildings. This means that the consumer responses should be easier to measure when compared with other building types.

Moreover, housing is an integral element in the well-being of the population of the U.K., hence how it performs over time is of consequence. The creation of appropriate policy by all levels of government is dependent upon good and current insights into its behaviour. Thomas (1986, p.1-2) saw market processes in the housing market as major forces in determining the objectives and methods of much urban policy.

Housing represents a major element of cities. Accordingly, the consumer behaviour exhibited towards it is of great significance in defining the structures and direction of evolution of urban environments as a whole. Reschovsky (1992, p.55) believed that the upkeep and improvement of housing which results from consumer attitudes is important: "On a more micro level, household upkeep / improvement impose externalities onto neighbours, and are pivotal to the process of neighbourhood decline and revitalisation." He proposed that 'homeowner demand' is integral to the way urban areas evolve.

3.0 THEORETICAL BACKGROUND

The evidence presented has shown that the housing life-cycle has changed, implying that there has been a shift in the expected utility assigned to various house forms by more recent consumer cohorts. Apparently, the relationship between old houses and alternative redevelopment opportunities reflects the current marketplace assigning old houses relatively more value, thereby reducing demolition rates. It is hypothesised that this results from the more subjective aspects of houses becoming increasingly important as a determinant of overall value. This can motivate research into the relationships between consumers and the available housing stock. If the way in which housing life-processes unfold has changed because of an increased weighting being given to attributes which are essentially not function-based or easily quantified, house values can be affected, on an ongoing basis, by how various design types relate to specific niches within successive consumer marketplaces.

Boon (2001) discussed how the value of design might be assessed, and how consumers, in a purchase decision, 'transcribe' the expected benefits they will receive, into a sense of monetary worth. That benefit is based on some evaluation of the total utility to be derived from the building as a basket of goods, many elements of which are essentially intangible, in particular, the building's 'style' or 'vintage'.

Hogarth and Reder (1986) noted "The modern disciplines of economics and psychology are the direct descendants of a common body of philosophical ideas" (p.1), but that they have evolved in very separate directions: "...whereas economists focus on outcomes, questions of process are central to psychologists" (p.10). Early economic and psychological theory was based on deduction within environments of little or poor quality data. Subsequently, experiments were devised to determine if reality corresponded with theory. A more recent discipline, market research, is highly applications focussed, and attempts to utilise the theories and methods of psychologists and economists to understand consumers and their decisions, in order to sell various goods to different market groups, or develop new products. Each of these disciplines has been reviewed for applicable theory and experimental techniques.

3.1 MARKETING AND CONSUMER THEORY

Reference to consumer research is appropriate in order to gain some insights into the complex, multivariate processes which lead to the development of consumer attitudes and preferences. Although the architectural discipline seems hesitant to explicitly apply consumer theory and marketing practices (Nasar, 1999, p.61-63), there are many concepts and tools which can be used to understand how buildings are assessed. While buildings have their own complexities, and material on the issue of how consumers deal with long-lived assets is almost non-existent, in many ways considering market research theory and tools does assist in the development of appropriate experiments to use on buildings. There are many similarities between buildings and other consumer products, such as colas or refrigerators - a fact which would upset many designers. A fundamental assumption behind choice theory is that the individual is, to a great extent, an independent consumer, not merely a puppet of the state or capital, although he is obviously influenced by them. Markets, then, exist as collectives of individual choices.

3.1.1 Background

There are various philosophical perspectives upon which consumer theory is based, which are discussed in detail in Marsden and Littler (1998). However, such differences tend not to obscure the fundamentals, which were developed in the 1960s (O'Drisoll and Murray, 1998, p.397). The original models are important in this investigation: "Criticisms of the early models revolved about the lack of evidence for the assumed degree of rationality for all but a relatively few purchase situations being characterised by very high consumer involvement" (O'Drisoll and Murray, 1998, p.398). Housing acquisition typically implies high consumer involvement, so it is reasonable to start with models which assume some degree of rationality, although it is possible to debate what constitutes 'rational behaviour'.

Product demand depends upon many factors, including population change, past and present levels of consumer income and wealth, prices and availability of other commodities, taste, availability and cost of credit, government policy, and consumer expectations. Holbrook and Hirschman (1982, p.181) sub-divided consumer research efforts into "(1) environmental inputs, (2) consumer inputs, (3) intervening responses, and (4) output consequences, criteria, and learning effects." They pointed out that research must extend beyond hypothetical constructs to relate to actions taken by individuals and groups of individuals towards products. Howard and Sheth (1990, p.147), focussing on pre-existing available sets of products, created a list of interrelated consumer responses to product stimuli: Attention, Comprehension, Attitude, Intention to Buy, and Purchase Behaviour.

As purchase behaviour tends to be an expression of preference, and if preference is rooted in the seeking of a maximum of expected satisfaction by individuals based on pre-existing attitudes (Mook, 1987, p.324), market behaviour relative to housing can be understood as a reflection of preferences held by the shelter-consuming population. However, many consumers' pursuit of satisfaction is severely constrained, typically by financial resources. For a low-income person, merely finding adequate accommodation within budget constraints may maximise possible satisfaction - accordingly things important to a wealthier individual, such as the enhancement of social status, may go unfulfilled, or indeed unrecognised.

3.1.2. Emergence of Theory and Practice

In historic and traditional economies, small scale and the immediate relationship between production, distribution, and consumption meant that businesses did not have to formally model or understand relationships and causalities. In the mediaeval city, for example, shoes were made in the back of a shop, from locally sourced materials, and sold from the front. In the small communities of the time, the supplier of hides, cobbler, and consumer probably knew each other, and were acquainted with each others' needs and expectations. Due to the shortness of the supply chain, large inventories of raw materials or finished goods were rarely required. Therefore, most producers could adjust product mix and design on a daily basis, simply according to what was being sold.

After World War Two, new factors gave considerable impetus to the development of consumer theory (Wilkie, 1990, p.3). Although through the industrial revolution, the distance between manufacturer and final customer became greater, an environment of unfilled demand for new products coupled with limited wages, meant that many manufacturers could ignore the finer nuances of consumer attitudes and preferences: instead, they could concentrate on fundamental invention, improving production efficiencies, and reducing cost. However, in the United States, in the late 1940s and early 1950s a satiation of the demand for many basic commodity-type durable products, such as refrigerators, utilitarian cars, and wireless receivers, became evident (O'Drisoll and Murray, 1998, p.394), together with the disappearance of large homogeneous consumer groups (Quelch, 1989, p.2). Companies searched for ways of maintaining demand. Assael (1998, p.32) proposed that, in addition, the emergence of consumer and environmental movements in the 1960s made it necessary for companies to continuously monitor attitudes, to ensure that their policies and products did not initiate government action, or cause them to become social pariahs.

From a practical perspective, the appearance of statistical methods and the computer made it feasible to collect and analyse the large amounts of data which are often necessary to explore consumer behaviour.

Some of the same type of processes might be proposed with respect to housing. Through most of the nineteenth and early twentieth centuries demand for housing was such that for much of the market it was only necessary for government or the building industry to create enough houses which achieved an adequate level of shelter. Given the demand associated with rapid urbanisation (Thompson, 1988, p.177), concern about more complex aspects of housing could be postponed.

3.1.3. Economic and Social Theories on Consumption

The need for theories of how consumer decisions are made arose with the appearance of modern economics, although the discipline did not immediately embrace them. The utility theory devised by Jeremy Bentham and James Mill made certain assumptions about consumer choice.

Bentham (1789) expounded:

> Nature has placed mankind under the governance of two sovereign masters, *pain* and *pleasure*. It is for them alone to point out what we ought to do, as well as to determine what we shall do. On the one hand the standard of right and wrong, on the other the chain of causes and effects, are fastened to their throne. They govern us in all we do, in all we say, in all we think: every effort we can make to throw off our subjection, will serve but to demonstrate and confirm it. In words a man may pretend to abjure their empire, but in reality he will remain subject to it all the while. The *principle of utility* recognizes this subjection, and assumes it for the foundation of that system, the object of which is to rear the fabric of felicity by the hands of reason and of law.

Quite apart from the attached moral values, Bentham assumed that (i) decision-makers are fully informed about available courses of action and consequences, (ii) consumers are infinitely sensitive to differences among alternatives, (iii) reliable information is available, and (iv) consumers are rational in their choices in that they rank order them according to the extent to which the choices maximise their personal utility. Such a 'Rational Theory of Choice' (Slovic, 1995, p.364) requires augmentation, because the assumptions are frequently violated, in particular because most consumers face incomplete information, and there are often significant costs in collecting it. Accordingly, for many decisions, consumers can only maximise expected utility - an assessment of 'real' utility will be unattainable. Moreover, more recent research, such as that regarding the impact of 'irrelevant choices' has shown that 'rationality' may often be infringed (Holbrook and Hirschman, 1991, p.179).

The development of theories of value, such as undertaken by Smith, Ricardo, and Marx, were an attempt to explain prices. Ricardo and Marx saw product value as somehow correlated with the cost of production, in particular the amount of human labour embodied in a product. In the late 1800s, 'neo-classical' economists such as Marshall (1891) integrated issues of supply and demand, so the intensity of consumer preference became an important element in the establishment of prices. The associated fundamental economic concepts of the role of the marketplace, diminishing marginal utility, and elasticities of demand still remain the fundamental basis for modelling the consumption

of goods. In neo-classical economics, it was seen as unnecessary to pursue the matter of how patterns of value were created in the minds of the consumers, in part because, at the point of equilibrium, in a market environment of perfect competition, value was seen to correspond with price. One shortcoming, as discussed by Woo (1992, p.1-2, 28-30), is that such models tend to encourage the assumption that preferences are static and 'prewired' (Woo, 1992, p.64), so create little incentive to attempt a detailed analysis of how they are created. Relative to durable consumer products, such as housing, such models give little guidance to the designer or manager, who could create better products with some knowledge of how consumers assigned value. However Woo suggested that such an assumption was originally necessary, as it allowed advances without ensnaring economics in other emerging disciplines, such as psychology and sociology. Through the twentieth century, accompanying the emergence of a more consumer-oriented society, in which market judgements of utility are obviously transient, theoretical moves were made towards the development of a theory of choice. On an ongoing basis, since the 1960s, there has been much work done in understanding how product assessments are formed by consumers, such as that undertaken by Peter Earl (1986), and specifically relative to building design by environmental psychologists.

3.1.4. The Process of Consumer Decision-Making

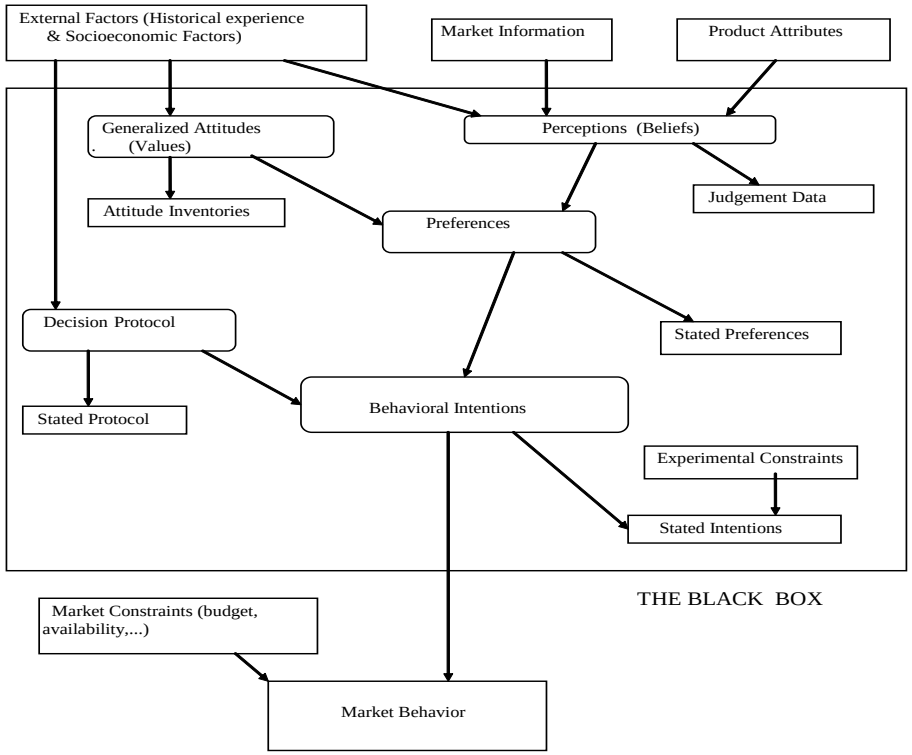
Decision-making is an integral part of modern human behaviour. Kaplan (1992) suggested that a consultant, working on behalf of an extra-terrestrial who wanted to know about humanity, might see information processing and gathering as a primary human attribute. However, how this process occurs is not immediately apparent. McFadden (1986, p.275) characterised the consumer as an "optimising black box". Not surprisingly, one model to explain consumer behaviour emerged in the Postwar period - that human decision-making could be seen as analogous to computer processes, in that, like computers, people have inputs, processing functions, and outputs. Peterson et al (1970, p.101) explained: "The human being can be thought of cautiously as a discriminating process which receives information about its surroundings and computes satisfaction. If the situation requires a decision among several alternatives, then the computation is of expected satisfaction, and the decision is an expression of preference." Accordingly, 'computational' methods were widely explored in the 1960s and 1970s, and the resulting theories have come to form the basis for much research and product development. Woo (1992) said that most evidence suggests that this does not capture the 'multidimensionality' of the human mind, which operates on both conscious and subconscious levels to deal with a complex and dynamic environment. Nevertheless, computational models remain in use, although they do not fully account for the apparent irrationality of many human choices, and the influence of marketing and advertising strategies which can manipulate product value and demand.

(a) Theoretical Structure for Consumer Decision Process

A useful structure, proposed by McFadden (1986, p.276), is included (Exhibit 3.1). This model has the advantage of recognising the separation between the 'real' elements of the decision process, and those which can be more readily accessed by the researcher: one can never know real preferences - but experiments can be devised which will yield 'stated preferences'.

Exhibit 3.1 Path diagram for the consumer decision process

From: McFadden, D (1986) "The Choice Theory Approach to Market Research" p.276



"Terms in rounded boxes are theoretical or latent variables, while those in boxes are observed directly, or measured by suitable experiments" (McFadden, 1986, p.276) Accordingly, experimentation and/or observation can only be conducted at certain points.

Although such path structures are worthy models in general, and alternative forms are included in most marketing texts; with respect to the detail there is no universal model which encompasses all consumer decision-making. Decision processes are seen to vary by the product under consideration, the context of the decision, and the characteristics of the decision-maker. The mechanisms by which the various components are linked are also an element in creating market behaviour.

(b) Consumer Decision Making: Simple and Complex Decisions

Methods have been developed to relate the mental processes and feelings of individuals to their purchase decisions. Business uses such models to prepare forecasts of demand, which lead ultimately to production targets, capital investment strategies and profitability predictions. Choice theories attempt to understand and predict the 'preferences' and market behaviour of populations of individuals. Preferences relative to any available product are determined by responses to a wide range of measurable variables which relate to a definable market segment (Buchanan and Henderson, 1991, p.65). For buildings, the set of variables would include immediately quantifiable attributes (size, quality of construction and location), as well as less tangible variables, which include those culturally-based factors (personal and social meaning,..) which influence how consumers will evaluate buildings.

Fundamental to these models is the assumption that a consumer evaluates any product on the basis of an assessment of the physical and psychological attributes of that product. The different models of consumer choice behaviour, as classified by Marsden and Littler (1998), vary in the assumptions with regard to how consumers collect and process information about the available products. Of course, no consumer has all of the information about any product, let alone all possible purchases; some information comes relatively readily, while there are costs, if only personal time expenditure, in gathering other pieces of information.

The simplest and most obvious way of exploring consumer behaviour with regard to a specific product, is to ask about preferences. Such a single attribute model deals only with the subject's ultimate reaction, for instance: "Do you prefer cola 'a' to cola 'b'?" Clearly, such models are limited in the depth of information they can offer, so through the 1960s and 1970s 'multi-attribute, expectancy value compensatory choice models' were developed and explored, by Lancaster (1971) and Fishbein (Burnkrant et al, 1982), among others. These were based on attempts to understand and model cognitive aspects of the consumer: that is what detailed beliefs people hold about the various attributes of the product under study and the perceived consequences of selecting that product. Such models propose that each evaluated product attribute is assigned a weighting by the consumer as more or less important in the formation of overall attitude and preference in what is usually an unconscious process. A completely rational consumer would choose the product which has the highest total expected value among the alternatives.

The debate whether product-oriented beliefs arise from holistic or compiled atomistic perceptions was considered by Bloch (1995, p.19). His example concerned motor cars, but in a housing context, the discussion would be whether an individual comprehends a building as a totality (holistic processing) or as a collection of elements (roof, windows, era of construction, materials, various

design details,...). Bloch suggested use of a fusion of the two theories, whereby the product is at first perceived as a whole; then if the consumer deems it appropriate, it will be disaggregated into individual elements. Hence, as an initial reaction, a consumer may react, with a general 'this is an interwar semi and it means certain things to me', thereby assessing it in terms of a previously known framework. Subsequently, if further analysis is deemed worthwhile, such as when evaluating a house for potential purchase, or when provoked in a survey, the consumer may disaggregate the various aspects of the house, and evaluate each more carefully. It would be expected that, due to the lack of a pre-existing framework for analysis, buildings which are less immediately familiar would be more prone to disaggregated assessment even in superficial evaluations. This might be contrasted with the purchase of a 'low-involvement' product (Assael, 1998, p 141), for example, paper kitchen towelling, for which it would be reasonable to believe that most consumers might make a purchase based on a general impression of the packaging, or the product colour. The low purchase price and the lack of significant negative consequences of making the wrong choice does not warrant detailed information acquisition or processing.

Consumer decision making can also be classified, as by Howard and Sheth (1990), as to whether a purchase tends to be (i) the result of habit or a brand-loyalty process or (ii) a decision which requires some sophisticated decision-making processes. Each of these can be subdivided as to the involvement incurred by the purchaser. High involvement purchases are those which are important to the consumer, either from a financial perspective or as they may relate to self-image or perceived social standing. Conversely, other purchases may be relatively unimportant, or are made in a context which allows little time for information gathering.

Assael (1998, p.67) summarised different types of decisions in a chart (Exhibit 3.2), although underlined the fact that these are in fact, continuums.

Exhibit 3.2: Types of consumer purchasing decisions

	HIGH-INVOLVEMENT PURCHASE DECISIONS	LOW INVOLVEMENT PURCHASE DECISIONS
DECISION MAKING (Information search, consideration of brand alternatives)	COMPLEX DECISION MAKING (autos, electronics, photography systems)	LIMITED DECISION MAKING (adult cereals, snack foods)
HABIT (little or no information search, consideration of only one brand)	BRAND LOYALTY (athletic shoes, adult cereals)	INERTIA (canned vegetables, paper towels)

From: Assael (1998), pg 67

For most consumers, house purchase decisions may be the most consequential ever undertaken, which suggests a considered search for information is involved. In addition, house purchases tend to be difficult to reverse, and incur high transaction costs: estate agent and solicitor's fees, stamp duty, moving costs, familial disruption, and potential financial loss. Accordingly, house decisions are often used in the marketing literature as examples where highly complex decision-making processes will occur. In contrast, other decisions can be classified differently. Some require little handling of information by the consumer: brand loyalty may steer the purchase of coffee, or visiting a hairdresser (habitual purchase), and indifference may dominate the purchase of paper towels or petrol (not consequential or different enough to justify gathering information).

Fiske and Pavelchak (1986) proposed that an individual encountering a new product, would attempt to classify it within an existing category. If no suitable category existed, the product characteristics are evaluated individually, so ultimately "… product evaluations are processed piecemeal only in certain instances" (Fiske and Pavelchak, 1986, p.192). Howard and Sheth (1990, p.139) postulated additional complexity in infrequent or new decisions. They felt that such a consumer will "… to some extent, generalize from past similar experiences." While they used the example of a new purchaser of Scotch whiskey relying on experience gained from past purchases of gin, this could have a role in house purchases; people may attempt to apply information gained relative to other products or experiences.

(c) Multiattribute Utility Models

Given the substantial impact of the house purchase decision on most consumer's comfort, finances, family relations, and social status, we can expect that most people will gather information and seriously evaluate alternative houses. Moreover, houses are complex bundles of goods, essentially "… sets of discrete, complex and indivisible alternatives" (Mason and Quigley, 1997, p.576). Housing relates to all four 'needs' as classified by Kamenetzky (1992, p.183-184): (i) biological, (ii) bio-psychological, (iii) psychological, and (iv) socio-cultural. Therefore, consumers will inevitably be forced to make trade offs; the condition of repair might be evaluated against the size of the garden, house style, or proximity to schools or employment. It is worthwhile for the consumer to spend time to acquire information: an experienced friend might be sought for advice about houses in specific areas or about renovation costs, or some specialist consulted.

Alternative forms for multiattribute utility models, largely based on McFadden's work, were considered by Nelson (1999, p.395-396) who presented a linear model as:

Exhibit 3.3: Linear Multiattribute Utility Model

$$U_{im} = \sum_{j=1}^{J} w_{jm} \; z_{ijm}$$

The utility 'U' that consumer 'm' perceives relative to product 'i' is the sum, for all of the 'J' attributes, of the product of the relative weightings 'w' of attributes 'j' to the consumer 'm' and the customers rating 'z_{ijm}' of each significant product attribute.

Of course, the quality and quantity of information of each attribute can vary substantially: it is possible to measure the size of a garden exactly, but understanding thermal comfort or safety is more complex, whether a house accords with one's self-image is highly personal and subjective. Moreover, the process cannot be expected to be free from error, so embeds risk. The consumer can only maximise expected utility: absolute utility has to remain a theoretical construct relative to houses.

Such models have been subject to considerable discussion and research, in order to gain better insight into how they function. McFadden (1986) and Bagozzi (1982) discussed the nature of the functions by which a consumer might compile different pieces of information. The two most applied methods are to assume either an additive or an averaging function. An additive model, such as noted above, implicitly assumes that the overall perceived product utility increases whenever positive information is received. The averaging model suggests that if a piece of positive information is contributed to the analysis, the evaluation will fall if that positive piece of information scores relatively less than the previously existing average. Both schemes imply some level of independent utility of the individual attributes, which may not be the case for many products, including houses. Considerable debate occurred as these models were explored, and various empirical studies have shown different outcomes. Arias (1993) criticised the principal of assuming that housing attributes are strictly additive, and cautioned that the complexity of the attributes of housing, and the fact that they cannot be chosen individually "cafeteria style", means that a consumer attempts to maximise satisfaction by selecting from pre-existing, specific 'bundles of attributes'.

Nevertheless, for houses, it is conceptually attractive to initially assume an additive model: typically information associated with the house purchase process is incomplete, subjective, difficult to obtain, and suspect, so it is likely that any non-negative information would enhance the evaluation of the house with which it was associated.

Jobber (1998, p.65) described the categories a consumer might use to assess different products on a disaggregated basis (Exhibit 3.4). While some, perhaps 'taste', might not universally apply (although smell might), most categories would apply to many products, including housing, suggesting

the multiplicity of criteria which may be used when assessing complex products.

Exhibit 3.4 Choice criteria used when evaluating alternatives

From Jobber (1998, p.65)

Technical:		
	reliability	durability
	performance	style/looks
	comfort	delivery
	convenience	taste
Economic:		
	price	value for money
	running costs	residual value
	life-cycle costs	
Social:		
	status	social belonging
	convention	fashion
Personal:		
	self-image	risk reduction
	morals	emotions

(d) Decision Mediators for Complex Decisions

Mook (1987, p.336-339) reviewed the concept of utility maximisation, whether the individual 'actually performs' the calculations or not, and the extent to which decisions are based on accurate information. For complex decisions, especially in a context of high uncertainty regarding information quality, a clear answer on how to maximise expected personal utility from a decision is unlikely. This may cause the emergence of what Howard and Sheth (1991, p.138) termed 'decision mediators' which are used to organise product information so it can be dealt with. Earl (1986, p.176) regarded the construction and analysis of the large decision matrices demanded by multiattribute utility models as beyond the capability of most consumers, so considered rules which they might follow to rank mutually exclusive decisions (such as a house purchase, where few people buy more than one). Earl proposed that individual consumers use short-cut methods to make complex choices, probably inevitable in the case of housing decisions. 'Satisficing' decision-processes are proposed as a form of short cut, where the consumer does not explore the universe of all possible options, but establishes a 'good enough' hurdle, and when it is achieved, undertakes to purchase. Slovic (1975, p.286), in experiments dealing with consumer attitudes to baseball players, found "…that people resolve choices between equally valued, multiattribute alternatives by selecting the alternative that is superior on the most important attribute or dimension. Reliance on the most important attribute produces highly consistent and predictable choices in contrast to the non-systematic mode of resolution implied by many theories of choice." Tversky et al (1988, p.375) agreed on the importance of the dominant attribute unless a secondary attribute gives a product "a decisive advantage." This suggests that identification of the most important dimension of decision-making is a key step in determining overall consumer preference.

Earl (1986, p.182-183) proposed that 'non-compensatory' choice algorithms play a significant role, especially in complex choices. Traditional compensatory models, in which a variety of product characteristics are important and a deficiency in one can be 'compensated' by higher performance in another, generate enormous choice matrices. Earl used a house purchase to explain complex decisions. and showed how readily a 25 X 18 matrix could be generated: the eighteen important attributes of twenty-five different houses are simply too many for most consumers to handle. Accordingly, consumers will supplement or replace the orthodox compensatory model with simpler heuristics, such as simple pass/fail filters for important criteria.

The complexity of the house purchase process, places pressure on all of the models. As well as the use of simple hurdles, Earl suggested that when faced with complex multi-variate problems, in which the consumer may be unable to rank order the characteristics, they may group "...the features together as if they were a single dimension of choice, and then applying to the group a satisficing rule with a simple-averaging or polymorphous form" (Earl, 1986, p.204). This is compatible with the notion of 'goodness of example' explored by Purcell (1987a); if it is impossible for the consumer to fully evaluate and rank order individual characteristics of buildings (Purcell used churches), the individual may cluster sets of them, and view them as a 'style'. If the characteristics do not readily identify a building as a 'church', the assembled bundles of characteristics may be identified as factories or fast-food restaurants, as done by Purcell's subjects. In the midst of the choices offered in the course of testing, a consumer may not be assessing detailed attributes, but be lumping them together - in which case a building which was easy to understand by being in the nature of a recognisable 'style' or use, would have an advantage in the choice process.

(e) Non-Rationality / The Failure of Invariance

Consumer decision-making has been further explored through various techniques which have found that completely rational models frequently fail. Slovic (1995) considered a variety of research which indicated how complex the structure of preferences can be, including the dependence upon the context of the decision, and the exact relationship between the attributes of available selections. In this vein, Shafir et al (1993) considered 'non-valued features' of products and demonstrated that the addition of information which would seem to be irrelevant to the choice being made, or the addition of an extra, but inferior, product to the choice set, or adding useless features to products, can change decision outcomes in unexpected ways. Their research found that "Choosing brands that offer worthless bonuses was judged as more difficult to justify and more susceptible to criticism" (Shafir et al, 1993, p.32). They also found trade-off contrasts, where people tend to avoid extreme values in decision sets, even if the product having the extreme value also apparently offers the highest expected utility. The advantages of products which are not 'too' different, is in the assessment process: they can be more readily judged against somewhat similar products - those

which have no ready comparisons are more difficult to assess, so are less likely to be chosen. This means that preferences can be biased by virtue of the available decision set, even if the other members of the set are not viable choices for the consumer undertaking the evaluation. Quigley (1997, p.555) supported this, relative to housing, and pointed out that many theories are based on testing the propensity of a consumer of purchasing one house as compared to another, but that there is likely a substantial impact of other, 'irrelevant', choices. As housing is pervasive and important, experiments cannot be conducted which are independent of wider, if remote, choice possibilities, about which most people are aware - few people live in palaces or castles, but most know they exist.

This does not mean consumers are completely non-rational, it is that they integrate a wide variety of information, including risk. Daniel Ellsberg explored 'ambiguity aversion' and found that people "...prefer to take risks on the basis of known rather than unknown probabilities" (Bernstein, 1998, p.280). Hutcheson and Montinho (1998, p.706) argued for an imbalance in the process: that often consumers feel that "...the cost of dissatisfaction is greater than the benefits of satisfaction." These two consumer characteristics will tend to attract most people, in complex and consequential buying decisions, to familiar products or those that can be readily evaluated. In the case of a house, a known form has known risks and disadvantages: an unusual house, where the risks and benefits are both unknown, is likely to be a less preferred housing form to the person who is not part of the building/property industry.

3.1.5. Consumer Choice in Housing

As was noted in the earlier sections which modelled how buildings moved through time, market-set notions of value determine points at which renovation, conversion, or demolition will occur. Demand for specific buildings results from the preferences held by consumers. Given that the short-run supply of different types of houses is essentially fixed, a shift in the way consumers assess buildings should change relative prices. This change can occur either through a change in the evaluation of attributes, or a movement in the relative weighting given to them in the overall assessment. If an increasingly affluent society means that consumers give higher weights to attributes which relate to the non-utilitarian aspects of houses, the prices of various buildings will be changed.

3.2 PRECEDENTS AND METHODS FROM ENVIRONMENTAL PSYCHOLOGY

"There are few forms in architecture to which people do not attach some meaning by way of convention, use, purpose, or value." So said Robert Hershberger at the First Annual Environmental Design Research Association Conference held in 1969 (Hershberger, 1970, p.86). Hershberger explained that a certain size and type of wood panel can be assigned "subtle feelings of warmth and protection", as a result of being interpreted as a door - it is more than a simple piece of wood.

A branch of psychology, 'environmental psychology' specifically deals with the interactive relationship between people and their surroundings. Environmental psychology is a complex field, so only the aspects which relate to the topic of this research will be discussed.

The field of Environmental Psychology was explored for two reasons. Firstly, it can help illuminate the ways in which people come to evaluate, and assign value to, physical environments. Secondly, numbers of tools have been developed, used, and refined in undertaking those investigations. There is a vast literature covering both, and some aspects are worthy of consideration, to help to explain consumer responses and guide experimental efforts.

3.2.1. Background and History

Although, matters of the environment and culture during the development of psychology played a secondary role, compared to other fundamentals of human behaviour, such as learning, perception, and memory, they could not be ignored and were inevitably seen as of some consequence.

A practical focus resulted from the need to increase productive efficiency as a result of the two world wars and the expansion of manufacturing and the development of wider ranges of consumer products in the first half of the twentieth century . An important study which related psychology to environment was conducted in 1927 by the Western Electric Company at its Hawthorne plant in Illinois. This widely referenced study (for example by Schultz, 2000, p.232) attempted to relate the productive efficiency of employees to environmental conditions, such as light and temperature. It found that the social and psychological attributes of the workplace dominated the physical conditions. The results of this study underlined the importance of the less readily quantifiable characteristics relative to the overall performance and success of human environments.

The specific investigative activities now termed 'environmental psychology' emerged in the 1950s and 1960s. Early work in the area occurred in a number of countries, with the earliest developments in the United States. In the United Kingdom the initiative was spearheaded by Terence Lee and David Canter at the University of Surrey. The American Journal, *Environment and Behavior* commenced publication in 1969, with the *Journal of Environmental Psychology* appearing in Britain

in 1981. The first annual conference of the Environmental Design Research Association (EDRA) was held in 1969, and in Europe, the International Association for People-Environment Studies (IAPS) was founded in 1981.

In the United Kingdom, much research related to the issues associated with the development of new environments, such as new towns and offices. The need for massive reconstruction and expansion "…brought the planners to propose the investigation and trial of new solutions for urban problems in general and habitational problems in particular" (Pol, 1993, p.27). The use of untried solutions made any information which could predict outcomes valuable. This meant that research "was consciously focused on policy implications" (Canter, 1987, p.1282).

This specialised field was based on work in a number of areas within the overall psychology discipline, but also reflected expectations from fields which could apply knowledge about the people-environment interface, such as business, health care, geography, urban planning, and architecture. There were many instances in the earlier work of psychologists which underlined the importance and complexities of the relationships people have with physical environments, however through the Postwar period there was an enhanced concentration on systematic studies.

The environmental psychology group at the University of Surrey, focussed on an "interactive study of the individual - built environment relationship" (Bonnes and Secchiaroli, 1995, p.8) which worked towards developing solutions to the relationship between people, buildings, and natural environments. Canter in *Psychology for Architects* (1974) connected environmental psychology and building design. He followed one aspect of John B. Watson's beliefs "…that human behaviour in buildings is open to scientific study" (Canter, 1974, p.v): that behaviour is predictable and field study will reveal underlying trends and principles. In a series of examples in the beginning of his book, he criticised architectural thought as being focussed on the concept that advances should be primarily revealed through discourse among the initiates, an approach largely discarded by psychologists and economists a century earlier.

There has been within the environmental psychology movement, a concern that, after a promising start, relatively few findings have been taken up by the architectural profession or the property industry. A 1999 conference *Looking for Environmental Psychology in the U.K.* contained lengthy discussions about how the promise of the 1970s had largely not been realised, that more recent insights went unnoticed, and that an increasing gulf was separating the psychologists from those who could apply the findings. Canter (1987, p.1301) proposed four reasons for the lack of engagement: (i) psychologists may not have clarified the messages to the extent that the findings have been applied, a problem also discussed by Franck (1984) and Philip (1996); (ii) in the dissemination process, the frequent use of lectures fragments knowledge into sub-disciplines and obfuscates wider meaning; (iii) designers tend not to consult written works but rely on experience;

and (iv) trade literature is more accessible and better illustrated. Franck (1984, p.412) argued that much research has oversimplified reality, including (i) an overemphasis on the influence of the physical environment on behaviour, (ii) suggestions that buildings directly influence people, and (iii) that indirect relationships are limited.

In particular, this lack of impact, meant that Nasar as recently as 1999 could still react: "*Architectural theory*... attempts to support conclusions from an analysis of patterns. It tries to build an argument for the author's particular aesthetics. Through profiling a select set of designs or designers, the author argues for how things *ought to be*, rather than describing *how they are*" (Nasar, 1999, p.62). The approach taken within environmental psychology still embeds the fundamental belief that design is important - people care about, and respond to, visual aspects of buildings, and that these are significant determinants of environmental quality and ultimately building value. Accordingly, there is emphasis on field research, to gain understanding of how to obtain and maintain quality in building design and urban environments.

3.2.2. Relevant Research in Relationships between Consumers and Buildings

In particular, relative to understanding consumer influences on housing life-processes, psychologists have adequately demonstrated that all human attitudes and preferences are not innate or universal. Orians and Heerwagen (1992) proposed a set of underlying preferences, which may have originated during the many generations through which humans lived as hunter-gatherers, during which the operation of natural selection favoured those who sought out, located, and occupied favourable savannah environments. However, Bonnes and Secchiaroli (1995) argued that ongoing processes are important, and that preferences are "...the outcome of processes of adaptation continually pursued by the human species with respect to the environment" (p.20). Within the choice structure, this means that, unlike the innate need for food or the avoidance of physical pain, people are not born with fixed attitudes and preferences for culturally based artefacts: they must be acquired. That implies that the conditions under which we live are important, because they may change from generation to generation, thereby affecting how we perceive and assign value to different environments.

Peterson et al (1970, p.102) defined the individual as a 'self-organizing system' which "develops and refines his preferences through experimentation and selective retention of whatever tends to be re-enforced by external approval, enhanced survival, or pleasurable sensation." In the modern era, such a process occurs within specific evolving cultural environments. Ultimately, from this basis, consumer preferences, as expressed in the marketplace, can be seen as the collective bundle of individual attempts to obtain optimum outcomes, often within an environment of uncertainty and poor information. As individuals have undergone a process of interacting with the environment, they build up a set of attitudes, and ways of evaluating and classifying new environments. Therefore, any

exploration of patterns of human preference is a search for common threads within a fabric of immense diversity, especially with regard to something with such complex attributes and meanings as housing.

(a) Predicting and Understanding User Response

A vein of research, extending back to the 1960s, has asked the related questions 'do people respond to buildings in the way that their designers intend?' and 'can responses be predicted?' One motivation for this work was to understand the extent to which designers may perceive buildings in a manner different from that of the general population. If designers were substantially different, it implied that ongoing experiments would be required so as to provide architects with information to support their activities - especially with regard to new building forms.

Hershberger (1970) conducted experiments on architects, architectural students, and non-architects, and found significant differences in how they form judgements. He noted: "...it could be expected that approximately 30% of the time when the Penn Architects [one of the subject groups] would judge a building to be good, pleasing, beautiful, interesting, exciting, and unique, the non-architects would judge it to be bad, annoying, ugly, boring, calming, and common." Hershberger and Cass (1988) explored this matter further and verified the results. This type of finding agrees with Earl (1986, p.195) who proposed that as consumers become 'connoisseurs', they add new attributes to their decision-making matrices.

Purcell (1984a and 1984b), in Australian studies, used photographs of modern-style churches to determine the extent to which architecture was a nonverbal 'language' shared by designers and various cultural and social groups. He detected little shared recognition of the buildings as religious facilities. Fawcett (1994) found significant differences in preferences for office buildings between users, planners, estate agents, developers, investors, and, in particular, architects. Chuang and Shiau (1997) demonstrated the same effect in their study of style recognition relative to Ming-style chairs, finding that 'designer' subjects varied from the 'non-designer' subjects. They felt that when classification became difficult because of few distinct cues, additional 'knowledge and experience' enabled the designers to differentiate better.

Having repeatedly demonstrated that designers are different from non-designers, there has been much writing, and many ongoing experiments, using a variety of techniques in attempts to gain insights into how attitudes and preferences for different environments, frequently houses, are formed. Some include Peterson et al (1970) who attempted to create a model of preference processes and 'preference space' based on U.S. survey responses, and Tobey (1992) and Anthony (1984) who considered houses. Stamps and Nasar have, separately and in combination,

undertaken numerous studies into the relationships between people and buildings. Green (1999) attempted to determine what the frequently-used word 'character' meant relative to the residents of an Australian coastal town, finding that naturalness, distinctiveness, and peacefulness were important in that context.

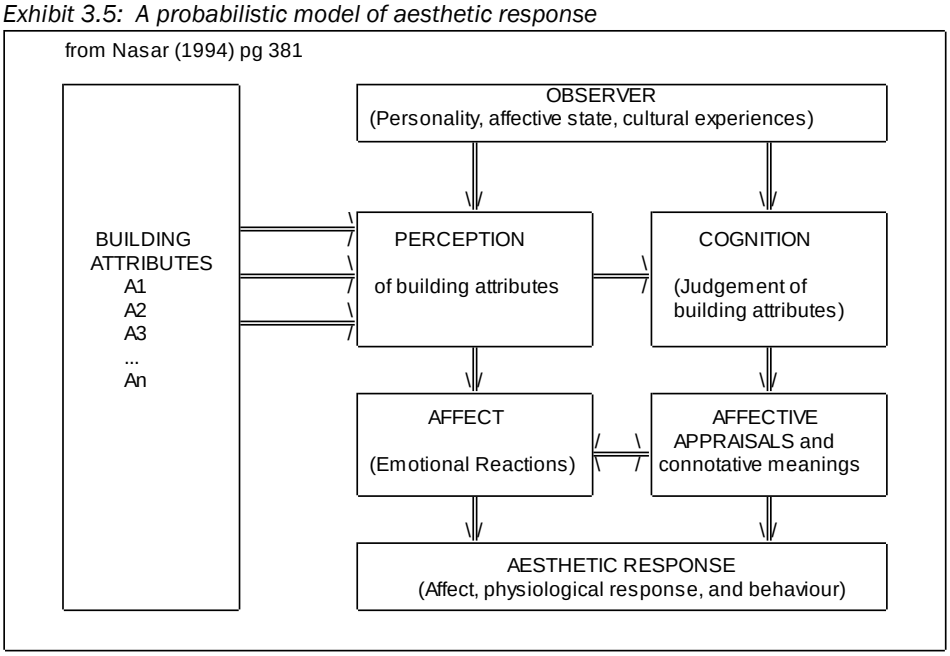
Sadalla and Sheets (1993) explored the social symbolism of building materials on house facades in a series of experiments undertaken in the south-western United States. Their work was based on the proposition that the house is an important long-term personal symbol, and people will derive or assume information about the inhabitants from various attributes of the house, including its material from which it is constructed. They documented a maze of relationships, whereby they could support "…both biological and cultural models of the process by which material acquires meaning" (Sadalla and Sheets, 1993, p.177). For example, they found that objective material qualities (hardness, weakness,…) were associated with the way the materials, and occupants of houses constructed of them, were perceived. Moreover, they also found statistical association between respondent personalities, and the types of materials they would prefer for their own dwellings. Within the cultural model of how materials might acquire meaning, consideration of the results suggests that very different outcomes might have been obtained in different social or geographic settings: for example the low-status implications of weathered wood and stucco exteriors they found, might not hold in different geographical locations, in particular where wood exteriors are commonplace, such as on the Pacific coast of North America.

Cooper (1976) discussed the relationship between the dwelling and the self within a framework of a multitude of levels of consciousness. While writing in an American context, she did consider the wider English-speaking world, and underlined that housing can have a substantial role as 'symbol-of-self'. She felt that the importance of the symbolic content of housing may "partly explain the inability of society to come to grips with the housing problem - a problem which is quite within its technological and financial capabilities to solve…" (Cooper, 1976, p.437). The case was made that if housing was a 'threat to self-image', for example high-rise flats for people with modest and lower incomes, and did not align with the image of a permanent home, it might 'violate' the self-image of the occupants, causing occupant dissatisfaction and vandalism. However, more affluent individuals can successfully occupy high-rise flats because the building form is not out of keeping with their self-image, and if it is, they can access other forms of consumption to reinforce self-image.

Various representations have been developed to describe the theories about how buildings come to be regarded. Exhibit 3.5 was proposed by Nasar (1994, p.381). This shows how a collection of building attributes might be perceived, processed, and filtered, ultimately leading to a response. In the context of research into consumer attitudes to the housing stock in the East of England, this process should be manifested as a propensity to purchase, renovate, sell, neglect, or maintain a dwelling. As might be expected, this cannot be treated strictly as a cause and effect relationship, but

responses are the result of the probabilistic state of the components influencing the process between building attributes and response.

Exhibit 3.5: A probabilistic model of aesthetic response



(b) Design Review

In the United States, one impetus for research into the relationship between buildings and the wider population, has been the emergence of 'design review' as a means of regulating the appearance of new building development. Design review is undertaken by lay boards, appointed by the local authorities, who have the power to reject projects, or require that modifications in appearance be made. Stamps and Nasar (1997, p.11) defined design review as "...a governmental process aimed at improving the appearance of buildings and the community." They found that the largest single group on such planning committees were from 'business', with the retired, real estate, law, and homemaking also having substantial representation. Essentially, with their discretionary capabilities, committee members are intended to act as proxies for public preferences in design.

Most of the research, including that by Habe (1989), Beasley (1994), and Stamps and Nasar (1997) has attempted to determine whether the activities of design review committees reflect the preferences of the wider public. One way this was done was to undertake experiments in which 'the public' evaluated different houses. Stamps and Nasar (1997, p.12) pondered: "'What physical components affect aesthetics?', 'How reliable are individual or group judgments of feeling?', and 'What demographic or personality variables affect aesthetic judgements?'" If committees are made

up of individuals whose preferences and evaluative structures do not align with those of the communities they represent, the design review process would be seriously compromised.

Stamps and Nasar (1997, p.13-14) reviewed a series of previous studies which compared houses approved through design review and 'nondesign review' houses which "showed little differences in judged compatibility or preference" (p.13). They suggested that psychological experiments on the general population using pre-construction visual representations would be more reliable in determining consumer reactions to proposed designs, and argued that houses subject to design review were preferred, but only to a small extent, probably as a result of "consensual design/building conventions already at work..." (Stamps and Nasar, 1997, p.29). Habe (1989, p.27) noted "...a good many forces including national and local architectural trends and attitudes, economics, a combination of zoning regulations, the property owner's motivations and tastes..." as shaping designs before they were submitted. This suggests that speculative builders and most clients of custom homes either are aware of the demands and expectations of the wider market and do not transgress them, or that home-builders themselves are good proxies for wider consumer evaluations.

Accordingly, in the United States there has been an impetus to undertake ongoing research into the question of public preferences, to verify the validity of design review and assist in the design of buildings likely to be approved. This has ensured that ongoing theory has been developed and methods refined.

(c) Stability or Differences of Responses between Groups

Of interest relative to the ageing of buildings is the research which has explored differences between groups. If different groups evaluate and value buildings differently, it is quite likely that over time, as new cohorts of consumers appear, and social and economic changes unfold, houses will come to be assessed and valued very differently.

If specific groups of the population respond to buildings differently, it should be important to understand the nature of the various user groups, and how their unique characteristics might affect responses to buildings. The research has been constructed around a number of sub-themes, and has findings which have an important relationship with investigations of building life-processes.

If preferences are subject to change, either as a temporal function or resulting from some other factor, design review guidelines are not universal, but specific as to time and place. Evidence has suggested that while there are significant differences between groups, there are also similarities. Nasar (1989, p.390) argued for variability in the implications of stylistic forms: "Although people infer connotative meanings from stylistic context, meanings may vary with experience and the

context." His findings (Nasar, 1989) included differences in the meanings attributed to various house styles by different socio-demographic groups, and between sample groups in Ohio and California. However, elsewhere he noted (Nasar, 1994, p.378) that "...research has repeatedly confirmed commonalties in architectural preferences..."

Sanoff (1970, p.334) found that rural-low and more urban middle-income respondents in California, relative to houses, "...vary considerably in their assessment of the visual displays" although they tended to describe the same 'ideal' house. Guiliani et al (1988) explored the relationships between the social and demographic variables of their subjects and the responses to home interiors. They found numbers of differences in response, based on, *inter alia,* social status and age, "...the social variables have a different weight in the two conditions: age and sex affect the responses related to the livability condition, while education (especially that of the father) affects the aesthetic responses" (Guiliani et al, 1988, p.49). Bechtel and Korpela (1995) compared attitudes held by students in Finland with those in Arizona. They found considerable differences between the way the two groups used adjectives to describe happy and depressing places. Perhaps unsurprisingly, the Finns ranked the adjectives 'cold', 'grey', and 'dreary' highest in describing depressing places, while the Americans used 'dirty', 'poor' and 'death'.

Specific reading of the wider literature supports the dichotomy that while there may be certain general preferences, such as for pitched roofs, or natural settings (Green 1999), other aspects are culturally determined. The research into architectural preferences has not been exhaustive, either geographically or temporally. In contrast, management research, such as Trompenaars and Hampden-Turner (1993) and Randlesome et al (1997), has repeatedly demonstrated the existence and importance of cultural differences.

Much of the research has been done in the United States, often in conjunction with design review concerns, but American findings may not all apply in the U.K. context. For example, Peterson et al (1970) found that, in a Chicago study, 95 percent of neighbourhood preference could be evidenced by "an appearance of newness and expensiveness,... an appearance of greenery, open space, privacy and 'naturalness',... and variety and richness of appearance as opposed to uniformity and monotony" (p.107). It could be argued that these findings align with traditional American ideals and that British houses and people are different. Accordingly, the applicability of such results when considering the existing housing stock in the East of England may be largely inappropriate, although it would be interesting to contrast the results of the same study undertaken in the U.K., or indeed in the same American setting thirty years later.

(d) What Environments are Preferred?

Some research has been directed to identifying preferences, as opposed to understanding underlying constructs or the roles they play. This underlines the difference between marketing research and environmental psychology: market research is usually focussed on understanding what is preferred, so as to be able to better design or sell products and services. In the property industry such fundamental research is not often undertaken, and when done, is rarely publicly available. However, some of the published material does suggest what is associated with preference.

Of the factors discussed in various sources, order and familiarity should be of consequence relative to consumer assessments of the East of England housing stock. Kaplan and Kaplan (1989, p.54) considered preference relative to the degree an environment makes sense to subjects, describing such constructs as 'complexity', 'coherence', 'legibility', and 'order'. Not surprisingly, a sense of order has been associated with familiarity (Nasar, 1994, p.385), as being when a building 'fits' previous experience. This was one of the elements explored by Purcell (1984a and 1984b): buildings which are closer to established prototypes are seen to be more familiar and comprehensible. Such traditional forms help to create a sense of familiarity and order even among unfamiliar office buildings. Canter (1974, p.5) argued that much of how individuals perceive buildings is driven by familiarity; that people who were in repeated contact with a building, or a form of building, came, over time, to perceive it differently. Green (1999) presented this differently, when attempting to understand the nature of 'character', a term widely used in regulatory frameworks, such as for conservation areas. He found that people tend to express a "…desire for environmental stability,… and for slower as opposed to rapid rate of change" (Green 1999, p.312). The importance of familiarity may be expected to be of importance in ongoing consumer preferences for various components of the existing housing stock. One cannot be familiar with a type of housing which does not exist, and presumably some process is involved in a new form becoming familiar. That familiarity may relate to preference helps to account for the preference of most user groups for sloped roofs and traditional exteriors on office buildings, (Fawcett (1994) and Green (1999)), or the sense of verticality for religious buildings (Purcell, 1984a).

One frequent finding is that overall preference does not have a linear relationship with all of its contributing components. Porteous (1977) argued that there is an optimum level of stimulation related to environments, which accords with a maximum level of preference. Not enough stimulation leads to boredom; too much creates "saturation and chaos in comprehension" (p.232). Kaplan and Kaplan (1989, p.55) agreed that complexity and non-conformance to prototypes tend to increase interest, however at very high levels decrease preference. Nasar (1994) discussed a variety of experiments which supported the finding that moderate levels of complexity tend to be associated with high levels of preference.

3.2.3 Summary

The value of the work of the environmental psychologists is to explore the users, and reject the notion that responses to the intangible attributes of built environments are incapable of measurement. Over a number of decades, procedures have been developed for collecting and analysing human responses, which can be applied to understand, and perhaps predict, behaviour.

The experiments undertaken herein probe attitudes and preferences about housing, by directly dealing with real consumers. Such consumers can also express their opinions in the marketplace through their purchase and refurbishment decisions. A further step is taken, which is unusual in environmental psychology research, but more common in marketing, of relating the findings to marketplace behaviour.

PART 2: EXPERIMENTS

It can be hypothesised that the nature of housing life-processes has changed whereby it no longer is dominated by the actions of physical deterioration or urban or technological change, but is increasingly a consequence of evolving consumer preferences. There are a number of provoking comments in the literature, however few efforts, outside of the psychological discipline, have been made to assemble empirical data to gain insights into the underlying processes. Baum (1991, p.135) in his research found that investors increasingly "...appear to place external appearance in a higher priority position [relative to configuration], as evidenced by the effect of building qualities upon yields." Goodman and Thibodeau (1995) acknowledged a 'vintage' factor to account for some of the unexplained variance in their house price model.

One possibility is to build a hedonic pricing model, as done by many researchers, and described by Malpezzi et al (1987, p.374). This might cover a specific market area, and attempt to include all quantifiable variables which might determine house value, concentrating on those which are of interest in supporting the hypothesis. Kain and Quigley (1970) used 39 measures of 'quality' for dwelling units and neighbourhood characteristics, including such things as building condition, landscaping, nearby nuisances, and extent of mixed use, for a sample of 1,500 dwelling units in central St.Louis (U.S.A.). When combined with census tract characteristics (including distance to schools, crime rates, educational achievement,...) to create a regression model for housing value, they found that house purchasers would pay a considerable amount to obtain 'quality' of the dwelling units. They concluded that "The quality of a bundle of residential services has at least as much effect on its price as such quantitative aspects as number of rooms, number of bathrooms, and lot size" (Kain and Quigley, 1970, p.436). However, the determinants of 'quality' were again not fully explored, so the work yielded little insight into the fundamental ways in which value results from the relationship between consumers and building design. If consumers act as simple decision-makers who rationally and consistently act to optimise expected satisfaction on the basis of measurable housing attributes, improved hedonic models should be able to predict housing life cycles. However, fundamental changes in the nature of the consumer may mean that, from time to time, they use different choice algorithms. A 'complete' model may remain elusive, especially if the choice process gives a high weighting to mutable consumer constructs, because of the temporal entanglements. As demonstrated in market research and environmental psychology investigations, it should be possible, through experiments conducted in the marketplace, to obtain some understanding about how fundamental consumer attitudes function to assign value to different house types.

Two investigations were undertaken to explore how different groups of housing consumers evaluate the existing housing stock. The first considered consumers in the Cambridge-centred area, whose attitudes and preferences may influence the ongoing evolution of the housing stock in Cambridge

City. The second experiment considered one very specific neighbourhood, to explore divergent attitudes which may exist there.

A change in the esteem accorded to different building types should lead to changed behaviour, which might be manifested in changing relative values of various house forms, and the propensity to maintain and refurbish them. A belief in longer potential building life may lead to higher maintenance levels, ultimately increasing the likelihood of long building lives. Boon (2001) discussed the relationship between value and design, and determined that while absolute measurements of preference of buildings may be impossible, ordinal measurement was possible, and the relative values of alternative designs could be established. Accordingly, it is appropriate to develop an awareness and comprehension of consumer attitudes and preferences, relative to how they assign value to different housing forms, in order to understand how the housing stock has evolved over the recent past, and what may unfold in the future.

Two further initiatives explored the marketplace to determine how prices and refurbishment behaviour might relate to expressed consumer attitudes and preferences.

4.0 EXPERIMENT ONE: SURVEY OF HOUSING ATTITUDES AND PREFERENCES

4.1 OBJECTIVES AND HYPOTHESES

The primary objective of the first experiment was to explore housing perceptions held by various population groups, relative to the stock of existing houses in the East of England area. It was hypothesised that consumer opinion would exhibit substantial differences corresponding to age cohort, even within one limited geo-cultural setting. It was proposed that such variability would not be random, and that patterns would appear. There was a possibility that evidence of predictability could be found, which would help in understanding the way future generations might come to esteem different housing forms and assign value to them.

In particular, it could be further hypothesised that after the 1970s the changed housing life-cycle has been a response to a fundamental shift in the ways consumers evaluate houses. Nutt et al (1976), suggested that matters of taste may at times dominate over economic or spatial matters. They commented: "It is suggested that the psychological motivations behind the survival of some urban areas, which by all conventional measures could be expected to decline… is a matter needing attention" (p.23). They modelled building obsolescing in terms of a 'behavioural system' of people and organisations, which is accommodated by a 'physical system'. The nature of the match or fit between the two, establishes the extent to which a building might be 'obsolescent'. A poor 'fit' implies 'obsolescence', with the resultant decline in market value making the building vulnerable to low maintenance levels and possibly demolition. Accordingly, the experiment considered the qualitative aspects of the 'fit': that is, how consumers perceive various houses.

The experiment acknowledges marketing assumptions which suggest that consumers shortcut the decision process. Relative to housing, Andrews (2001, p.203) argued that consumers dramatically shortcut the housing decision-making process: "Every year millions of private citizens buy homes with little more than visual evidence of QOP [quality-of-place]." He explained that housing consumers perhaps may be best to use the "rich but informal visual data" in making their choices, but that this factor tended to be ignored by public decision-makers who place high reliance on quantitative measures. Even quantitative attributes of housing may be evaluated according to qualitative measures: few purchasers are likely to know the actual floor area of the various houses from which they select, but this measurable attribute may be secondary to whether a house feels 'spacious'.

Initially, it was felt that, experimentally, differences would be expressed primarily according to respondent age, even though they may be caused by other underlying factors, such as education, employment, and childhood environment, all of which have changed dramatically through the twentieth century. Regardless, differences correlated to consumer age cohort are of major

consequence in housing markets, because housing acquisition varies through the human life-cycle. Few individuals in the U.K. are active housing consumers before age 20, passively occupying environments provided by families, educational organisations, or the state. Through their twenties, many people form families, and undertake a first independent acquisition of housing. Accordingly, a large amount of activity in the housing market is focussed on the stage when people are aged 20 to 35. After that, transactions occur as households relocate to other regions, or as they purchase larger houses to accommodate larger families and greater means. At the other end of the human life-cycle, decisions are likely to be focussed on empty-nester or retirement housing.

The fact that different age cohorts may have different attitudes and preferences with regard to housing is important. Accordingly, the first experiment was designed to identify and interpret such differences.

In understanding and comparing different generations, a longitudinal study would be the most valuable Unfortunately, for most housing researchers, longitudinal studies lasting decades are not possible, so interpretation of cross-sectional research, in combination with information drawn from such longitudinal studies, or earlier studies, as may be relevant to the questions, can act as a proxy. The methodological necessity is to determine the extent to which representative results can be obtained from a cross-sectional study. In the case of housing attitudes, such a study, paying attention to the nature of generational change, should be promising.

4.2 METHODOLOGICAL BACKGROUND

4.2.1. Overall Method

This experiment drew on well-established methodological techniques for analysing human attitudes and perceptions used by the psychology and marketing disciplines. The research focussed on subjects who are, have been, or are likely to be, active housing consumers. Some previous similar research has had a non-U.K. setting, or used undergraduates (for example, Purcell, 1984a). Cultural differences may exist between countries, and with regard to housing, students may be poor subjects, as they are not usually discretionary, active, housing consumers, and their attitudes to different housing types may not have emerged. Accordingly, the first experiment exposed representative consumers to photographs of houses available in the East of England, and requested responses. Other methodological issues, which relate to more than one of the experimental initiatives, are considered in the overall discussion.

(a) Choice of Techniques

Lancaster (1971) argued that a consumer does not want a market good in itself, but is interested in acquiring the characteristics of that good, that is, those properties which generate utility. However, more recent consumer theory suggests that how the consumer arrives at a comprehensive product assessment may either be by undertaking a disaggregated analysis of individual product attributes, involve the use of some 'short-cut' processes, or by a holistic appraisal of the product. Notwithstanding the consumer processes, markets are the collective result of patterns of individual judgements about how expected utility might be maximised. Specific questioning should help in understanding not only the evaluations being made, but gain insights into how and why they are being made. Following Lancaster's theory, asking people about different characteristics of houses should reveal how different groups appraise available houses.

The research literature from both marketing and environmental psychology was reviewed for appropriate methods. While it is possible to use an overall response process using paired photographs 'which do you prefer?', it was apparent that with respect to the 'ordinary' housing stock, the variations of the photographic stimuli required to achieve useful results would be difficult. One study, (Fawcett, 1994) used various office buildings, and concentrated on separating the responses by different user groups.

The primary tool, paired-adjective scales, usually termed 'semantic differential scales', have widespread precedent in both marketing and environmental psychology. These include Hershberger (1970), Canter (1974), Tobey (1992), and Chuang and Shiau (1998) who considered environmental matters. Deemer and Minke (1999) investigated teacher efficacy and Hutcheson and Montinho

(1998) assessed shopping satisfaction. Holbrook and Hirschman (1990) supported the use of such techniques, especially within the context of a high involvement purchase decision, notably when the 'symbolic' or 'experiential' role of the products is significant. They commented: "The growing body of work in these areas suggests that respondents can typically provide meaningful data on perceptions and preferences across a broad array of relevant objects or activities" (p.181).

Marketing research books, such as Churchill (1999), describe a variety of techniques to extract meaning from consumer responses. Exploratory factor analysis was attractive, because of the similarity to the models of choice decision-making, whereby various product attributes are evaluated and weighted in order to generate preferences. Moreover, compared to 'nonattribute-based' approaches, "ascertaining the key attributes that determine customer preferences,..." is a fundamental focus of the technique (Churchill, 1999, p.858-859). The method, as discussed by Bryman & Cramer (1997) is to develop sets of paired adjectives which are relevant to the way in which people might evaluate the stimuli. These are used as the ends of the semantic differential scales. Factor analysis is used to obtain insights into how evaluations are constructed, based on sets of underlying attitudes - analogous to the multiattribute analysis proposed by decision-making theory.

Although the concept of factor analysis extends back to Spearman's work on intelligence measuring in the beginning of the twentieth century, it became an established tool largely as a result of the work of Charles Osgood and colleagues at the University of Illinois in the 1950s (Osgood et al, 1957). They explored meaning in general and established a method of categorising individual adjectives according to how they are dealt with by groups of people. Osgood's model proposed that modes of description of various phenomena could be categorised into 'dimensions' which could be visualised as points in n-dimensional space. Such dimensions relate to underlying categories of experience which the observer derives from the stimulus, and each represents a particular manner in which people organise attitudes. Experimentally, these attitudes are reflected in how people respond to various adjectives, and by analysing the use of these adjectives, one can gain insights into underlying fundamental meanings, and make informed inferences about likely behaviour, which may be able to be corroborated in the marketplace.

(b) Development of Experimental Methods

Determination of Semantic Differential Scales

The essential theory behind exploratory factor analysis is that fundamental human attributes are very difficult, if not impossible, to observe. The 'Path Diagram for the Consumer Decision Process' proposed by McFadden (Exhibit 3.1) classifies attitudes, perceptions, preferences, and decision protocols as "theoretical or latent variables" which are not directly observable. They are, however,

accepted to be integral elements of how a consumer processes product information, in this case about alternative houses, and makes a choice. The researcher, must interpret experimental data which is an artefact of the underlying structure, and thereby gain useful insights into the relevant determinants. Experiments can be structured to use respondent expressions of the not-directly-observable underlying factors to ascertain the nature of the unobservable constructs.

Clearly, it is critical that the adjective pairs are appropriate to the phenomenon under consideration, understandable, and meaningful to the respondents. Hence, some of the adjective pairs suggested by Osgood et al (1957) are unlikely to be of value in evaluating housing. 'kind - cruel', 'sane - insane' and 'fast - slow' are less likely house evaluations than, for example, 'comfortable - uncomfortable,' or 'beautiful - ugly'. Canter (1974, p.81) noted the most frequently occurring architectural dimensions as being: (a) 'pleasantness', (b) 'tidiness', (c) 'friendliness', and (d) 'comfort'. Hershberger (1970) in his study of various architect and non-architect groups in the north-east United States, found the emergence of three dimensions which he termed 'space-evaluation', 'organization-evaluation', and 'potency-aesthetic', although their composition differed markedly by subject group. As might be expected, marketing research has a more concrete focus: Lehmann et al (1997, p.621), used cars as an example, consumers evaluating them according to reliability, engineering, luxuriousness, distinctiveness, and quality. Baker (1991, p.152) suggested some initial exploration to determine what attributes are relevant to the specific research being undertaken.

Analysis Techniques

In keeping with the precedent research, the survey and analysis were developed to employ factor analysis. In addition, the data was assembled into tables and graphs, and analysis of variance performed to confirm statistical differences between respondent groups and between the ways they evaluated different house types.

While principal components analysis (PCA) is usually first described in the literature, and is the default process presented in SPSS, the statistical software employed, principal axis factoring (PAF), one of the methods often termed 'common factor analysis', has a focus on the development of unobservable constructs, rather than reducing large numbers of variables to smaller numbers, as is the orientation of principal components analysis. Bryman and Cramer (1997, p.279-280) suggested that for this reason, it is to be preferred in dealing with marketing-focussed material. Specifically, the difference between the techniques is how each handles different types of variance associated with data sets. The factor analysis process can only distinguish common variance (shared by the members of the sample population), as opposed to unique variance which is a combination of specific variance (specific to a particular variable) and error variance (resulting from fluctuations inherent in attempts to measure anything). Principal components analysis deals with all of the variance in a variable, while principal-axis factoring attempts to exclude specific variance.

In the analysis stage, principal axis factoring yielded somewhat clearer solutions than did principal components analysis, however the differences were confined to levels of the factor loadings: in no trial did substantial differences appear in the overall solution structure. This conforms to Sharma's comment "…in most cases it really does not matter which of the two techniques is used" (Sharma, 1996, p.108).

Typically. factor solutions are subjected to rotation to make them more interpretable. Various methods are available which attempt to minimise the explained variance for the individual factors (Churchill, 1999, p.850-852). Generally, orthogonal rotations retain factors which are uncorrelated with each other: that is, conceptually, they are at ninety degrees to each other. This gives a degree of clarity to results due to the independence of the factors, but reality may be that some of the underlying factors are, in fact correlated. Due to the ease of use of SPSS , various rotational techniques were tested. While both orthogonal and oblique rotations offered insights into the data, the SPSS default 'varimax' orthogonal rotation was used in the final analysis.

The data processing aspect of factor analysis is only part of the analytical problem, primarily because the output requires interpretation in order to derive meaning. Moreover, there is the issue of the 'Factor Rotation Problem' where multiple solutions are possible, as discussed by Sharma (1996, p.97) who stated "…the solution that gives a theoretically more plausible or acceptable interpretation of the resulting factors would be considered to be the "correct" solution." The literature contains many such cautions about the interpretation of factor analysis output. This means that the dimensions extracted should not be taken on the basis of numerical results alone. Fortunately, current software allows one to undertake repeated analyses, allowing the assessment of the robustness of the solutions, given different data subsets and analysis characteristics. In addition, simpler analysis techniques were used to support the findings.

Perceptual Maps

Attribute-based 'perceptual maps' can be created using the results of factor analysis, to depict how products are perceived in the marketplace according to the identified dimensions (Churchill, 1999, p.414-415). Using factor analysis results, for each case (individual house analysis), it is possible to use the factor loadings to obtain an estimated 'factor score' for each dimension or factor. This process is expressed as (Norusis, 1990, p.336):

Exhibit 4.1: Formula for generation of factor scores

$$F_{(est)jk} = \sum_{i=1}^{p} W_{ji} X_{ik}$$

where, the estimated factor score, $F_{(est)jk}$ is the linear combination of the original variables, X_{ik} weighted by W_{ji}, the factor score coefficient for the *j* th factor and the *i* th variable. This creates an overall numerical score for each evaluation on each of the significant dimensions. In SPSS these are produced in a standardised form (mean equal to 0 and standard deviation of 1). Although this process is 'exploratory', factor scores and perceptual maps can help give insights into underlying decision-making processes relative to the overall evaluations, including how different house types are assessed. Of course, this is created in n-dimensional space, with n corresponding to the number of important dimensions.

4.2.2. Sampling Issues

There were several issues concerning sample sizes for factor analysis, however, from a practical perspective, they tended to be secondary to more fundamental aspects of sampling. The overall target frame was determined to be that part of the population of the East of England region which might consider, or had considered, the purchase of a house in Cambridge, however as it was desired to compare successive groups of house consumers, it was necessary to obtain appropriate sub-groupings.

Four methods were considered to determine sample sizes.

(a) Statistical Precision

Typically, requirements for statistical precision determine appropriate sample sizes. The appropriate sample size will allow the researcher to establish, to a reasonable extent, that on the basis of the sample data, the population mean is within some useful range, (confidence interval). In this survey, such a sample mean might be, the expression of the level of perceived comfort offered by a Victorian house. Accordingly:

Exhibit 4.2: Formula for establishing sample size, given confidence limits

from Churchill (1999, p.551)

$$H = z * \frac{\sigma}{\text{sqrt}(n)}.$$

where:

H is half of the acceptable range into which the population mean should fall (it is desired that the estimate of the population mean is no more than H from the true population mean);

z is a constant drawn from the standard normal tale, based on the confidence required;

σ is an estimate of the standard deviation of the population;

and *n* is the sample size

Using preliminary survey response results for typical adjectives, (standard deviation of 1.2), to achieve a confidence level of 95 per cent that the sample mean is within a range of plus or minus .25 of the population mean, 89 responses are required. If the acceptable range is increased to plus or minus .5, 22 responses are required. Given that the returns contained different numbers of responses from different population groups, this suggests a quota sampling method (Churchill, 1999, p.505) whereby sampling is undertaken until enough of the important sub-groups are obtained - whether or not the final respondent mix precisely matches that of the overall population.

(b) Rule of Thumb for Sub-Groups

However, much of this study compared disaggregated population subsets. Lehmann et al (1998, p. 291-292) recognised that subsample analysis can multiply the data required many times, to the point that collection becomes unfeasible, even for corporations with significant resources, and suggested practical guidelines. Groups which do not appear to be different can be combined. However, their concluding recommendation was that "...it is desirable to have at least 50 to 100 observations per segment" (Lehmann et al, 1998, p. 292). Accordingly, achieving a minimum number of observations per important population subset in this range was the target for data collection. In the analysis, of certain adjectives, relative to individual house types, smaller groups appeared, and were cautiously used.

(c) Functioning of Analytical Techniques

Factor analysis does not embrace rigorous statistical tests, however some guide tests exist, and are included in SPSS, including the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy. This measures the homogeneity of the observed variables. Various sources, including Norusis (1990, p. 317), reference Kaiser who characterised KMO scores "... in the 0.90's as marvellous, in the 0.80's as meritorious, in the 0.70's as middling, in the 0.60s as mediocre, in the 0.50's as miserable, and below 0.5 as unacceptable." In the ongoing analysis of the data, KMO scores were seldom below .85, which supports the validity of using factor analysis in dealing with the data.

The Bartlett test of sphericity, provides a statistical test on the probability that the correlation matrix for the data set might be an 'identity matrix', that is where all of the correlations between observed variables are zero. Again, in all of the analyses included, this test indicated adequate results were achieved.

Bryman and Cramer (1997, p.279) discussed how to ensure reliability of the factors: they pointed to a widespread consensus that there should be "more subjects than variables" but also referenced sources which believe that there should be at least five responses per variable, with at least 100 responses for each analysis. Hence, when disaggregating the data set and analysing on eighteen variable scales, each group must have an essential minimum of eighteen. Five subjects for 18 variables suggests 90 responses per sub-group, and 13 variables suggests 65, with ultimately a desirable number of 100. Hershberger (1970) compared factor loadings of different respondent groups, using as few as twenty-one subjects in sub-groups, and was satisfied that stable dimensions and factor loadings had emerged, as verified by tests undertaken. In the experiment herein, because it was the intent to disaggregate the data into separate sub-groups for comparison, and because each respondent commented on a number of photographs, the need to achieve good representative samples of the different groups outweighed the actual requirements of the analytical techniques.

(d) Precedent:

Considering previous research, numbers of experiments have been conducted with limited numbers of respondents. For example, Sanoff (1970) used three groups of 25 each, and, as an extreme, Sime (1993) considered a total of three related individuals.

4.2.3. Age of Houses

Many Victorian reproductions, of varying levels of authenticity, have been built recently. The extent to which reproductions could be detected by the respondents and how they relate in esteem to the authentic versions would help establish consumer knowledgability. While the creation of reproduction houses is often required by the planning system, it was felt possible that the Cambridge area housing consumer creates a specific demand for such a product. Accordingly, the initial surveys asked the respondent to select an era in which each house had been constructed.

4.2.4 Overall Evaluation

A question about the overall evaluation of each house was included in the trial responses, it was eliminated as the analysis was focussed on factor analysis. However, it was later restored, in order to obtain a measure of overall evaluation. Relating this to McFadden's diagram (Exhibit 3.1), it adds information about a different point in the process - through an immediate response, it gives some indication of a 'Stated Preference'. The semantic differential scales are presented after the general data about the respondent is requested. This corresponds to methods suggested by choice theory: there is an overall response, and, if deemed necessary, the consumer undertakes a more detailed

product analysis. Such two-stage surveys are used in testing other products, for example, cola preferences: the respondent is asked for their overall preference (how much they like each cola relative to others presented), and then is probed on such things as sweetness, colour, taste intensity..., in order to understand how the overall evaluation was generated. This allows insights into the relative importance of the different dimensions in creating overall preferences. A further reason is that while the factor analysis process allows the creation of preference maps using factor scores, the nature of factor rotations, means that they must be treated with some caution. The ability to relate a final result to the underlying process as may be revealed through the factor analysis can act to support the validity of the analysis.

4.2.5. The Use of Photographic Stimuli

A further methodological issue is the use of photographic stimuli. It might seem desirable to have people consider various houses directly. However, recruiting coach loads of real consumers to view different types of quite ordinary houses is impractical. Secondly, doing so means that locational issues will arise, with people readily able to evaluate the area, not just the building. Fortunately, the use of photographs to ascertain human responses has been well established. There is a history of experiments conducted to test the relationship between human appraisals of actual environments and photographic and even drawn representations.

Experiments demonstrating the validity of photographic testing, were undertaken in the early 1970s, and reviewed in detail by Hershberger and Cass (1988) and Stamps (1993 and 1999). Hershberger & Cass conducted experiments with various moving and still photographic media, and verified the results of previous experiments, demonstrating high correlations between judgements based on visits to buildings and photographic representations. They did note however, that in real visits, *all* buildings were generally evaluated as being "more good, beautiful, pleasing, friendly, and unique" and "buildings were judged as more quiet and safe during real visits" (Hershberger and Cass, 1988, p.205). Stamps (1993) conducted experiments which demonstrated again that photographs serve well as stimuli, that pre-construction line drawings were reasonable simulations, and that there were almost no preference differences "attributed to the difference between photographs taken normal to the building surface and photographs taken at an angle to the building surface" (Stamps, 1993, p.128), although one cannot evaluate something about which one has no knowledge. The extreme robustness of media representations has been assumed in many experiments: Sadalla & Sheets (1993) used line drawings showing building materials as experimental stimuli, although Hershberger and Cass (1988, p.202) cautioned against the use of "the usual architects' sketches and line drawings" and architects' perspective drawings as not being readily interpreted by laymen.

In this experiment, most of the images are of house types which are familiar to most consumers, so the subjects already have significant knowledge about the sides, back, interiors, and meaning of the various houses. This means that the experiment is different than those which have considered office buildings (Fawcett, 1994) or churches (Purcell, 1984a), because images of familiar buildings do not have to be evaluated as thoroughly: the photographs can be expected to stimulate existing and detailed knowledge. This is different in the case of the modern high-style houses, each of which is unique, and likely unfamiliar. For example, one of the sample high-style houses (number 413), does not obviously display windows. In interviews, it was obvious that this gave people problems relative to the 'light-dark' question: the results show that most respondents did believe the house was light, but had to infer it from other aspects of the design.

Nevertheless, there are methodological limitations which are shared with the precedent experiments in the literature. While the experimental medium is visual, which is the same as the primary conduit for information on buildings, other attributes which are obtained during routine assessment of housing are absent, such as might be collected by the other senses. The digital photographs were 'sanitised' so there is little or no information about building context - something which is obviously important with respect to how real buildings are evaluated. Moreover a written response was requested, from which behaviour is extrapolated, including the propensity to purchase, maintain, and renovate. There is also the problem about possible misrepresentation of responses, however Hogarth and Reder (1986, p.11-12) indicated that a fundamental belief held by psychologists is "...that (a) subjects in experiments tend to do as best they can and (b) it would typically require far more effort on the part of subjects to falsify responses deliberately than to respond truthfully."

4.2.6. Classification of population

(a) Age Groups

As this investigation was focussed on the question of how successive cohorts of consumers might evaluate housing, much of the analysis was conducted using five age groups (Exhibit 4.3). Early analysis of the returning data indicated that the group aged 60-69 was worthy of special consideration, as it appeared to contain some specific opinion. In the analysis, respondents under age 20 are seen as inexperienced 'pre-consumers', a quite separate group from those termed 'active consumers', who are aged 20-69.

Exhibit 4.3 Housing cohorts used for analysis

Aged under 20: (born 1982 to 1989)
Most of the members of this group live in their parents homes, so have little or no housing discretion. In this group, there were no subjects under age 12.

Aged 20-34: (born 1967-1981)
This group is forming households and undertaking first time house acquisitions, or possibly upgrading to a larger house, in conjunction with an expanding family.

Aged 35-59: (born 1942-1966)
Most of the members of this group will have formed families, and acquired their first houses. The activity in this group will be in expanding and moving. Few of this group will have become active, independent, housing consumers before the end of widespread urban redevelopment, or the emergence of the class shift suggested by Ainley (1993, p.25-33), which occurred in the 1960s, associated with the emergence of the 'counter-culture'.

Aged 60-69: (born 1932-1941)
This group is of interest, because they represent the primary purchasers of new Postwar (50-70s) stock, and few will have significant pre-war memories. They might reflect the attitudes and expectations of the economically deprived war and early Postwar period, during which they were children and young adults.

Aged over 70: (born before 1931)
Most of the members of this group are either living in a house acquired some time ago, or in retirement accommodation. The older members of this group (over 80) will inevitably have been brought up in housing built before the First War, under the influence of Victorian parents, and some will have formed their own households in the late Interwar period.

(b) Social Status

Sample populations are often classified into social groups. Social status emerged in the mid-nineteenth century as a way of classifying respondents because it was seen to be linked with urban disease patterns, a major Victorian concern (Rose, 1995). It has continued because many researched attributes have been found to be correlated with social status. Chapman (1955, p.119) commented that classification systems are based on "a group of socio-economic variables: income, education and culture, dress, possessions, speech, manners, morals and other attitudes", which tend to come in "consistent patterns, there being a positive correlation between the levels of the separate components." Accordingly, as such patterns relate to prevailing socio-economic factors, and they may be different to those encountered historically, it is necessary to consider the nature and logic behind any classification system utilised.

The system created in the 19th century, remains widely used as the 'Registrar-General's Social Classes (RGSC), re-named in 1990, 'Social Classes based on Occupation'. Ongoing evolution has occurred in the system, partially driven by changes in the way in which society and the economy function, and the way in which social class is understood. Rose (1995) explained that the significance of occupation as a determinant of social class has increased over time. (The reason for this is underlined by considering one survey response in this experiment indicating that a father had been a 'gentleman' - which seems near-ludicrous now). T.H.C. Stevenson, a statistician in the General Register Office, who was involved in much of the development of the classifications through the first decades of the twentieth century, believed that occupation was a better indicator of 'culture' than measures of assets and income. Rose (1995) commented that Stevenson saw assignments of social status to social classifications as "dependent upon individual judgement", and that the

validation of an assignment method was confirmed by the significance of the experimental results produced.

Through the twentieth century, there has been ongoing reassignment of occupations. In particular there is a conflict between whether occupations are classified according to their standing in the community or the skill required. In particular, as discussed by Ainley (1993, p.20-21), there is the likelihood that classifications of occupational skill have been arbitrary, in particular when they attempt to relate male- and female-dominated occupations. Ainley also saw a shift in occupationally dominated systems which occurred through the 1960s: "The real differences in clothing indicated by the old labels, blue and white collar, were lost as manual workers could no longer be identified away from their workplaces now that they drove to work like everyone else, no longer walking cap on head, lunchbox in hand. New appetites were excited by mass marketing that put on every high street what had previously been exclusive first to the wealthy and then to some of the old middle class..." (Ainley, 1993, p.33). Nevertheless, he stated that, in spite of a major impact from de-industrialisation, significant class divides still remain.

It is necessary to consider societal changes over time, and older research underlines these changes. Consideration of the scale used by Goldthorpe et al (1969), shows the level to which some changes have occurred since the mid 1960s. Higher education has had its impact on many occupations: many now might not accord a 'bank cashier' high status. Chapman (1955, p.137) cautiously grouped anyone in receipt of a pension together with the indigent and unemployed, although noted that widows' and pensioners' responses related more to their former economic status. Very clearly, in the Cambridge Conservation Area study (Chapter 5), university lecturers, even at quite advanced ages, responded differently than manual labourers of the same age cohort. In attempting to understand differences in the value assigned to different housing types by successive generations, this is important. Unfortunately, due to the social pervasiveness of treating older people as simply 'retired', in the surveys, many older people considered their previous occupation as irrelevant to any data collection, and accordingly, it had to be very specifically requested. The use of using occupational classification as a proxy for socio-economic status is a convenient classifier - however it is necessary to keep in mind the underlying assumptions. These include, that a wide range of personal attributes and behaviours cluster together with occupation, and that the status and nature of different occupations remains unchanged over time. Thrift (1987, p.217) suggested 'extreme caution' in making intertemporal comparisons: for example, professional occupations may not now enjoy the same premium of reputation over managerial and executive occupations they did some decades ago. It is also possible that the duration of formal education may be an important determinant in establishing attitudes. Among the respondents, it was quite apparent that such skilled manual occupations as 'painting restorer' are typically associated with very high educational attainment. This suggests that for comparing different social groups of different ages, one must use a coarse classification system.

The survey respondents were classified according to Macdonald and Ridge (1988) who re-interpreted and modified a scale previously used by Goldthorpe (1969).

Exhibit 4.4 Table used for occupational classification

Based on Goldthorpe et al as interpreted in Macdonald & Ridge (1988)

(1) I - Professional
- 1 (a) Higher professional, managerial and other white-collar employees
  - Chartered accountant, business executive, senior civil servant, graduate teacher)
- 1 (b) Large industrial or commercial employers, landed proprietors

(2) II - Administrative and Managerial
- 2(a) Intermediate professional, managerial and other white-collar employees
  - (Pharmacist, non-graduate teacher, departmental manager, bank cashier)
- 2 (b) Medium industrial or commercial employers, substantial farmers.

(3) III 'Intermediate' - clerical and sales
- 3(a) Lower professional, managerial and other white-collar employees
  - Chiropodist, bar manager, commercial traveller, draughtsman, accounts or wages clerk
- 3 (b) Small industrial or commercial employers, small proprietors, small farmers
  - Jobbing builder, taxi owner-driver, tobacconist

(4) IV - Self-employed, non-professional [Macdonald calls this group 'petty bourgeois, and includes farmers]
- 4(a) Supervisory, inspectional, minor officials and service employees
  - foreman, meter-reader, shop assistant, door-to-door salesman
- 4(b) Self-employed (no employees or expensive capital equipment)
  - window cleaner, jobbing gardener

(5) V - Technician and supervisor

(6) VI - Skilled Workers

(7) VII - Other manual labourers, including farm labourers.
- Farm labourer, builder's labourer, dustman

Short cut proposed by Macdonald and Ridge:
- Service includes I and II
- Intermediate includes III
- Working: includes all others

The categories needed some modification to deal with the specifics of the data collected. This follows Stevenson's notion - that if the system was revealing - then it probably was a worthwhile system. Assael (1998, p.410) noted "Marketers use three socio-economic factors - occupation, income, and education..." but discussed other indicators of social class, such as consumption patterns. Other data collected, in particular education and frequency of foreign travel was considered of possible consequence, so assisted in the classification of individuals. Some respondents indicated they were 'housewives', and, inevitably in Cambridge, some were older graduate students. Some subjectivity is inevitable in placing individuals into the different groups. In particular, in the Cambridge setting, it was obvious how oriented towards a traditional manufacturing base traditional scales are. Specifically, the scale does not readily deal with a variety of computer-related and publishing employment. The descriptions of occupations of 'engineer', 'consultant', and 'manager' also are ambiguous, however as educational background was also requested the assumption was made, for example, that a 50 year-old 'manager' who finished school at age 16, and lived in a modest neighbourhood, was probably a lower-level 'intermediate' manager.

In the final analysis, a simplified scale, as described by Macdonald and Ridge (1988) was used, which groups Goldthorpe's categories into three, being 'Service' (groups I and II), 'Intermediate'

(group III), and 'Working' (groups IV, V, VI and VII). Other categories were used for 'Artists' (including a wide variety of occupations), 'Students', and 'Housewives and Others'. Older studies would have encountered relatively few 'service' respondents, however their proliferation suggested dividing the group, so a separate category of 'High Achievers' was used, which included members of traditional high-status professions, such as solicitors and physicians.

4.3 IMPLEMENTATION

4.3.1. Survey Phases

The survey process was undertaken in waves, to test and develop the methodology, in accordance with the suggestions of Baker (1991). This allowed the development of appropriate adjective pairs and appropriate photographic stimuli.

The initial stage was conducted between October 1998 and April 1999, using interviews dealing with between one and five individuals. With the oldest subjects, one-on-one sessions were often necessary, in order to accommodate limitations in vision, hearing, and/or the ability to manipulate a pencil. In subsequent phases, mail-back material was used, although sessions for specific groups at schools and seniors' facilities were used to access those groups. The forms and photograph selection received ongoing minor modifications during the earlier survey process.

4.3.2. Subjects and Distribution Methods

During the initial interviews, parameters for the acceptability of respondents were (i) for the older cohorts that they were or had been home owners or renters in Cambridge or surrounding villages, (ii) for the middle cohorts that they were the heads of independent middle-income families, and (iii) for those under age thirty, that they were current home owners, or were of a socio-economic group which suggested that they would likely become home-owners. Three years was the required length of residency in or near Cambridge. Although the attendance of an interviewer was not strictly necessary, and often the interviewer merely turned the photograph cards, respondent comments were useful in identifying areas in which methodological improvements were appropriate.

For interviews, subjects were identified through various contacts, including schools, neighbourhood organisations, churches, and seniors' organisations. No inducement was offered to participate, and apparently none was required. Most people were quite interested in participating. The one inducement frequently requested, and, if requested, granted, was that after the interview, the participant be told about the experiment and preliminary results.

Using an interview process was time consuming, particularly in arranging for the participation of subjects. Furthermore, it was apparent that by using certain institutions and expanding rings of personal referrals, some elements of the population were not being reached. Accordingly, alternative methods were explored. Four street-side interviews indicated that such a process, even dealing with two or three photographs, would not yield thoughtful responses. Respondents had to be able to give more time to contemplate the stimuli and questions, which was not possible in busy urban locations.

As the first part of the Conservation Area survey (Chapter 5) had been already conducted, the high level of response from mail-back surveys distributed to individual houses had been demonstrated. This encouraged the use of a similar method. Accordingly, for the subsequent parts of the survey, most of the data came from mailback responses to a 'freepost' address, although specific interviews were still arranged to reach certain subset groups, in particular those aged over 75 and under 20. Other interviews were undertaken on an opportunistic basis. All of the data was included in one database. Tanur (1985, p.158-159) discussed the nature of responses for interviews and self-reporting forms, and found no evidence for differences in the nature of responses between the two methods, except for self-reporting methods offering "greater validity on sensitive questions" (p.158), and the housing questions were not 'sensitive'. Accordingly, the interviews and mail-back responses were grouped together.

People with immediate connections with the building and property industry were initially excluded, as previous studies such as Fawcett (1994) and Nasar (1989), show that such persons frequently have distinctive attitudes and preferences. It was inevitable that with a mailback form, a certain number would be returned by people so engaged, however these represented a small proportion of the overall responses, so were included in the analysis - much as builders, surveyors, and estate agents are a part of the real property market, although 'artists', including painters, writers, photographers, potters, and architects were classified separately.

The surveys were distributed through the Cambridge-centred area. For the larger centres, a variety of neighbourhood types and eras was always included.

4.3.3. Stimulus Photographs: Selection of House Types

The subjects were asked to respond to photographs of houses from the East of England. Most houses selected fell into sets of speculative developer-built structures which are best described by the era in which they were built. In contrast to the American house types and communities which were the focus of previous studies, such as by Nasar (1989) and Tobey (1992), most streets in the East of England are dominated by repeated examples of one or two house forms which vary only in minor detail. Medhurst and Lewis (1969, p.82) stated: "...a description such as 'late Victorian villa in south Manchester', or 'mid-Victorian terraced house in Oldham' conjures up a fairly precise vision." Most houses can be readily classified by the eras in which they were built.

To avoid issues of price and size, all houses were of two storeys (some with converted loft space), with three or four bedrooms, two reception rooms, and would currently offer reasonable accommodation for a family with two or three children. The issue of house price was not considered in the selection because prices are affected by location, and, indeed, according to the hypothesis, by

the factors which were the subject of the experiment. Exhibit 4.5 shows the housing categories and numbers of photographs used.

Exhibit 4.5 House classifications used in survey

	Number of Individual House Photographs Utilised
- Victorian/Edwardian (termed 'Victorian' regardless)	8
- Interwar Developer	7
- Interwar Council-built	4
- Post Second War (1950s, 1960s, 1970s)	7
- Modern Developer (1980s to present)	4
- Victorian/Edwardian Reproductions	6
- Modern architect-designed 'high-style'	10
- Miscellaneous types	8
Total:	54

A selection of photographs used is included as Exhibit 4.8.

Purcell's (1984a) deliberations on building 'prototypes' indicated a necessity that each photograph would be readily and uniformly accepted as a representative of its genre. Accordingly, what might be recognised as 'typical' houses of the various types were chosen. The selection of photographs was modified in response to ongoing data analysis and observation of the subjects during interviews.

The class of privatised Interwar Council-built houses was not initially included, but added in response to responses to one photograph initially included in the 'miscellaneous' category. It was clearly eliciting a specific response and attracted comment. The houses included as 'Interwar Council' were constructed immediately after the passing of the enabling Housing and Town Planning Act of 1919, and termed 'Addison Act Houses'. The Cambridge examples, cost the then-considerable sum of £900 each to build, and initially rented at 12/6, so as noted by Reynolds (1980), were never available to the low income population.

Refurbishments have created visually different house forms. Subjects' comments suggested a further way of understanding the attitudes and preferences of different generations of house consumers - the extent to which 'modernisations' might be seen as positive or negative. This is most apparent among the Interwar houses, both council- and developer-built, resulting from the replacement of original windows with 'picture windows'. Photographs of both types of Interwar Builder semi-detached were included in the original survey, however it was possible that other differences in the photographs accounted for the different responses. Accordingly, 'retouched' photographs were added, being identical except for the windows (Exhibit 4.9).

In contrast to the mass-produced houses of various vintages, ten 'High-Style' houses were included. These were defined according to the cynical classifications proposed by Stamps and Nasar (1997). They used two criteria to identify such houses: (i) a 'soft' guideline, that the house might be published in an architectural journal, and (ii) an explicit formula:

f=0.73 (Roof not gable or hip) + 0.57 (curved roof) + 0.53 (large or asymmetric windows) + 0.38 (non-compact or nonorthogonal footprint)

The main criteria, for selection of examples of this form was the ability to obtain a useable photograph. As High-Style houses do appear in the Cambridge-centred housing market, and are of possible interest to builders and planners, and may indicate how new house types might be evaluated, their inclusion was deemed necessary.

The 'Miscellaneous' houses, which were unique examples but did not qualify as High-Style houses, were removed from the photograph set after the initial trial. While the responses do suggest alternative research possibilities, they seemed subject to very specific evaluations, so did not immediately reflect on the overall life-cycle of the wider housing stock.

4.3.4. Photographic Techniques

For the first 35 subjects 'unretouched' house photographs were used; subsequently the images were modified to remove the extraneous details which are inevitable parts of reality, including dustbins, evidence of construction, utility boxes, and cars. A sky with white, fluffy, cumulus clouds replaced any overcast skies. These changes were done to minimise any possible impact on responses from differences resulting from such factors. In all cases photographs were cropped to remove indications of location, and the houses were selected, or modified, to show landscaping characteristic of their respective types.

The sequence of the presentation of the photographs was changed periodically, and, in the interview setting, a quick preview was given of the complete photograph set, in order to minimise bias which may have been attracted by the order of the photographs.

4.3.5. Questionnaire

The pilot study was used to develop an appropriate method to deal with housing attitudes. An initial questionnaire was developed using eight semantic differential scales, requiring responses between pairs of adjectives, on a scale of 1 to 7, following the methods described in Churchill (1999, p.395-398).

Additions and removals of variables were made until after 172 respondents had been surveyed, in order to attempt to understand the emerging results in greater detail. Specifically, adjectives were added to elicit more comment on consumer beliefs about the functional aspects of the various houses. Adjectives were discarded if they failed to add useful data, in order to limit the survey size. Exhibit 4.6 shows the use of adjectives.

Exhibit 4.6 Adjectives used in surveys
Survey numbers are for identification of individual surveys only, and are not continuous.

Adjectives Used In Surveys

	Survey Numbers					
Survey Numbers:	1-12	13-40	101-131	132-156 201-227	301-433	500-
Number of Respondents:	12	23	31	50	56	630
Pleasant / Unpleasant	≣	≣	≣	≣		
Characterful / Characterless	≣	≣	≣	≣	≣	≣
Light / Dark			≣	≣	≣	≣
Durable / Trasient			≣	≣	≣	≣
Uplifting / Depressing						≣
Liveable / Uninhabitable						≣
Impressive / Unimpressive	≣	≣	≣	≣	≣	≣
Comfortable / Uncomfortable	≣	≣	≣	≣	≣	≣
Interesting / Uninteresting	≣	≣	≣	≣	≣	≣
Inexpensive / Expensive to Maintain		≣	≣	≣	≣	≣
Friendly / Unfriendly	≣	≣	≣	≣		≣
Spacious / Cramped						≣
Up-To-Date / Obsolete			≣		≣	≣
Prestigious / Low Status			≣	≣	≣	≣
Useful / Useless	≣	≣	≣	≣	≣	≣
Beautiful / Ugly	≣	≣	≣	≣	≣	≣
Evironmentally Appropriate / Inappropriate				≣	≣	≣
Easy-to-Clean / Difficult to Clean			≣	≣	≣	≣
Exciting / Boring			≣	≣	≣	≣
Safe / Unsafe			≣	≣		
Clean / Dirty			≣	≣		
Sophisticated / Unsophisticated			≣	≣		
Graceful / Awkward			≣	≣		

Explicit, 'concrete' scales were not part of the Canter / Osgood methodology, but ongoing building operating cost implications were commented upon by the respondents, and appeared to be of consequence in the construction of the consumer evaluation of houses. The use of 'concrete' adjectives is more common in market research than in psychological research (Lehmann et al, 1997), because "marketers have been more interested in developing profiles for the brands, stores, companies, or whatever is being compared, as well as total scores by which the objects could be compared" (Churchill, 1999, p.396).

An additional scale about expected maintenance costs was added after 12 surveys were completed, and later one about environmental appropriateness, to determine to what extent a change may have occurred with respect to increasing concerns about the environment. Andrews (2001) pointed to a correlation between economic well-being and an interest in environmental quality. He referenced a variety of American studies which indicate a connection, which leads to public pressure for increased

quality in urban and rural environments, albeit with a number of associated enigmas. He suggested: "Good economic conditions allow environmental issues to gain salience even as the resulting growth exacerbates environmental problems" (p.203).

Adjectives were eliminated for the following reasons:

(i) Adjective pairs which appeared to be interpreted as synonymous, as indicated by high correlation coefficients were eliminated. These included:

Pleasant/unpleasant; Beautiful/Ugly; Graceful / Awkward: The pairs Pleasant/Unpleasant and Graceful / Awkward were eliminated:

Exhibit 4.7: Correlations between 'pleasant', 'beautiful', and 'graceful'

Correlations (Spearman's rho):

	Pleasant	Beautiful	Graceful
Pleasant	1	.732	.648
sig:	<.000	<.000	<.000
Beautiful	.732	1	.757
sig:	<.000	<.000	<.000
Graceful	.648	.758	1
sig:	<.000	<.000	<.000

Prestigious/Low Status; Sophisticated/Unsophisticated: These two pairs were introduced at the same time, but the responses were highly correlated (r=.714, sig.<.000). In an interview context, respondents appeared to have a greater problem interpreting 'sophisticated/unsophisticated' so it was eliminated.

(ii) In the interview process, certain adjective pairs appeared to be disproportionately troublesome. These were:

Safe / Unsafe: This was apparently meaningless to most respondents. In the interview context, people often looked for burglar alarms as an indication of 'safety'.

Clean / Unclean: People often stated that it depended upon who was living in the house. There was a moderate correlation (r=.593, sig.<.000) with Easy-to-clear/Difficult-to-clean, which was apparently more readily interpreted.

Following Canter (1974, p.79), the pilot stage form was designed so that the adjectives on the left could be interpreted as positives, and those on the right as negatives. As a result of being able to observe how subjects completed the forms, it was noted that some apparently made an overall evaluation and then simply went down the form with little further reflection, circling the number for each scale which roughly corresponded to their overall evaluation. In market research, this is termed 'haloing', whereby subjects will respond to their overall feeling of the product, rather than specific attributes (Lehmann et al, 1998, p.185 and 642). With some of the scales reversed, respondents are forced to give each adjective pair specific consideration. Accordingly, some of the scales were reversed.

As a variety of literature, previously noted, suggests that we tend to esteem those things which are familiar, a response was included, for each house evaluated, in the final surveys (those assigned numbers of over 500) in order to measure such an effect.

How Familiar are you with this type of house?
Never seen one ❑ I've seen one ❑ Know them well ❑ Occupied one ❑ Occupy one now ❑

4.3.6. Use of Mail-Back Responses

The mail-back forms presented fewer houses to each respondent than the interviews. This represents some compromise, however demanding too much from the respondents tends to decrease the response rate (Lehman et al, 1998). The first 133 mail-back surveys asked the respondent to respond to four houses in detail; the final sets asked each to respond to six with a general indication of preference, and three or four using the detailed scales. A sample mail-back survey is included as Exhibit 4.10.

Exhibit 4.8 Selection of house photographs used in survey

Classification of Sample:

Victorian / Edwardian: 150, 515, 410

Interwar Builder: 516, 517, 156

Interwar Council: 513, 512

Postwar (50-70s): 519, 510, 520

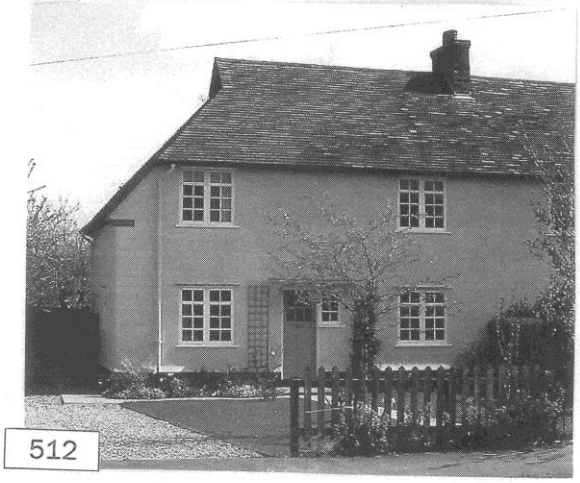
80-90s Builder: 223, 411, 412

Victorian Reproductions: 151, 211

High-Style: 153, 413


519


151


512


515


517


510


513

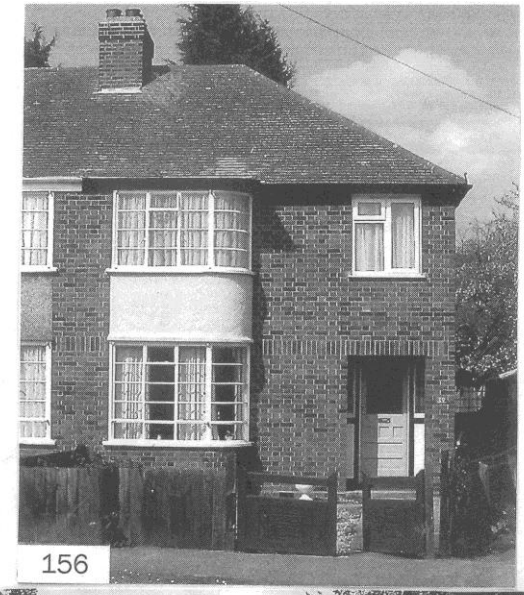

153


411

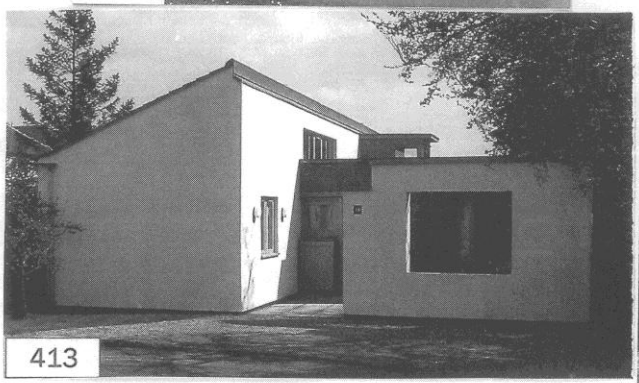

516


150


223


156


211

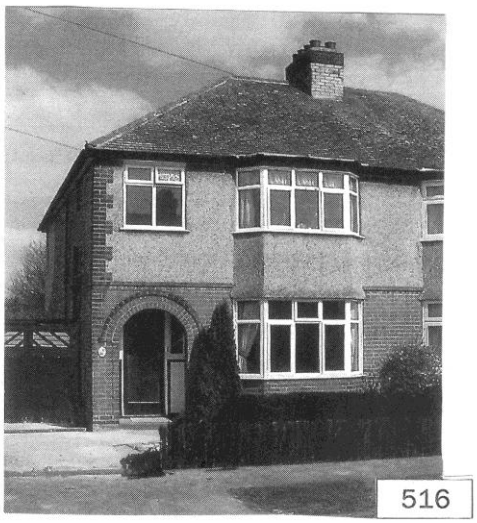

413


412


410


110
520

Exhibit 4.9: Photographs of Interwar houses showing different windows



Interwar Builder Houses

Interwar Council-Built Houses

Exhibit 4.10: Sample mail-back survey form

SURVEY OF HOUSING INTERESTS AND PERCEPTIONS

Conservation Areas Project, University of Cambridge,
The Martin Centre for Architectural and Urban Studies, 6 Chaucer Road, Cambridge, CB2 2EB

The Conservation Areas Project is working to increase the understanding of how neighbourhoods evolve, and what causes them to increase or decrease in favour. Accordingly, we would appreciate your responses about your own neighbourhood, and also about some house types. Research such as this helps better planning and design decisions to be made about the future of our urban areas.

Do not provide your name or address, in order to assure complete anonymity.

Before You Do Anything Else: Please Consider Each of the Houses Shown on the Attached Page:

Assume each was in an equally convenient location, and offered the same size accommodation. Please indicate the overall rating you would assign to each, as a place in which you would like to live (circle the appropriate rating for each):

Building 519 High 7 - 6 - 5 - 4 - 3 - 2 - 1 Low
Building 151 High 7 - 6 - 5 - 4 - 3 - 2 - 1 Low
Building 512 High 7 - 6 - 5 - 4 - 3 - 2 - 1 Low
Building 515 High 7 - 6 - 5 - 4 - 3 - 2 - 1 Low
Building 517 High 7 - 6 - 5 - 4 - 3 - 2 - 1 Low
Building 510 High 7 - 6 - 5 - 4 - 3 - 2 - 1 Low

Your Age: 12-14 ❑ 15-19 ❑ 20-24 ❑ 25-29 ❑ 30-34 ❑ 35-39 ❑
40-49 ❑ 50-59 ❑ 60-69 ❑ 70-79 ❑ 80-89 ❑ 90+ ❑

Male ❑ Female ❑ Nationality _____

Occupation: (previous occupation if not now employed): _____

Father's Occupation: (previous occupation if deceased or not now employed): _____

Mother's occupation: (previous occupation if deceased or not now employed): _____

Age at which your full-time formal education was completed:
14 or under ❑ 15-16 ❑ 17-18 ❑ 19-20 ❑ 21-22 ❑ 23-24 ❑ 25+ ❑ Still at school ❑

Over the past ten years how many times have you travelled outside of the United Kingdom:
None ❑ 1-2 times ❑ 3-4 times ❑ 5-7 times ❑ 8-10 times ❑ 11-15 times ❑ Over 15 times ❑

How long have you lived in this city or area? _____ years. How long have you lived in this street? _____ years.

How many adults live here? _____ How many children aged 18 or under? _____ Children aged 18-24? _____

Do you own or rent? Own ❑ Private Rental ❑ Council Rental ❑ Housing Assoc'n ❑ Other ❑ _____

CHILDHOOD HOME: When Built: Pre-Victorian ❑ Victorian/Edwardian ❑ Interwar ❑ 1950-79 ❑ 1980-99 ❑

Where located: City centre ❑ Suburban ❑ Village ❑ Rural ❑ Other: _____

Location: City or County: _____ Nation: _____

With regard to your street, please indicate the extent to which you agree or disagree with the following statements	***Strongly Disagree***	***Disagree***	***Neither***	***Agree***	***Strongly Agree***
I believe this area is of special architectural interest:	❑	❑	❑	❑	❑
I believe this area is of special historical interest:	❑	❑	❑	❑	❑
I agree that the Local Authority should control the exterior design of houses in this area very carefully.	❑	❑	❑	❑	❑
I would give consideration to the appearance of the surrounding houses if I was to alter my home.	❑	❑	❑	❑	❑

112

CONTINUED ON OTHER SIDE

Exhibit 4.10: (continued)

Please Complete for Each of the Building Photographs For each photograph indicated consider every pair of adjectives and circle the number which corresponds to how you feel about that house. For example, Durable/Transient; if you feel the house is very durable, circle a high number, if likely to be short-lived, circle a low one.

Impression of Building: *House Number*

Characterful	7..6..5..4..3..2..1	Characterless
Dark	7..6..5..4..3..2..1	Light
Durable	7..6..5..4..3..2..1	Transient
Depressing	7..6..5..4..3..2..1	Uplifting
Liveable	7..6..5..4..3..2..1	Uninhabitable
Unimpressive	7..6..5..4..3..2..1	Impressive
Comfortable	7..6..5..4..3..2..1	Uncomfortable
Interesting	7..6..5..4..3..2..1	Uninteresting
Inexpensive to Maintain	7..6..5..4..3..2..1	Expensive to Maintain
Friendly	7..6..5..4..3..2..1	Unfriendly
Spacious	7..6..5..4..3..2..1	Cramped
Obsolete	7..6..5..4..3..2..1	Up-to-Date
Low Status	7..6..5..4..3..2..1	Prestigious
Useful	7..6..5..4..3..2..1	Useless
Beautiful	7..6..5..4..3..2..1	Ugly
Environmentally Appropriate	7..6..5..4..3..2..1	Environmentally Inappropriate
Easy to Clean	7..6..5..4..3..2..1	Difficult to Clean
Boring	7..6..5..4..3..2..1	Exciting

How Familiar are you with this type of house?
Never seen one ❑ I've seen one ❑ Know them well ❑
Occupied one in the past ❑ Occupy one now ❑

Impression of Building: *House Number*

Characterful	7..6..5..4..3..2..1	Characterless
Dark	7..6..5..4..3..2..1	Light
Durable	7..6..5..4..3..2..1	Transient
Depressing	7..6..5..4..3..2..1	Uplifting
Liveable	7..6..5..4..3..2..1	Uninhabitable
Unimpressive	7..6..5..4..3..2..1	Impressive
Comfortable	7..6..5..4..3..2..1	Uncomfortable
Interesting	7..6..5..4..3..2..1	Uninteresting
Inexpensive to Maintain	7..6..5..4..3..2..1	Expensive to Maintain
Friendly	7..6..5..4..3..2..1	Unfriendly
Spacious	7..6..5..4..3..2..1	Cramped
Obsolete	7..6..5..4..3..2..1	Up-to-Date
Low Status	7..6..5..4..3..2..1	Prestigious
Useful	7..6..5..4..3..2..1	Useless
Beautiful	7..6..5..4..3..2..1	Ugly
Environmentally Appropriate	7..6..5..4..3..2..1	Environmentally Inappropriate
Easy to Clean	7..6..5..4..3..2..1	Difficult to Clean
Boring	7..6..5..4..3..2..1	Exciting

How Familiar are you with this type of house?
Never seen one ❑ I've seen one ❑ Know them well ❑
Occupied one in the past ❑ Occupy one now ❑

Impression of Building: *House Number*

Characterful	7..6..5..4..3..2..1	Characterless
Dark	7..6..5..4..3..2..1	Light
Durable	7..6..5..4..3..2..1	Transient
Depressing	7..6..5..4..3..2..1	Uplifting
Liveable	7..6..5..4..3..2..1	Uninhabitable
Unimpressive	7..6..5..4..3..2..1	Impressive
Comfortable	7..6..5..4..3..2..1	Uncomfortable
Interesting	7..6..5..4..3..2..1	Uninteresting
Inexpensive to Maintain	7..6..5..4..3..2..1	Expensive to Maintain
Friendly	7..6..5..4..3..2..1	Unfriendly
Spacious	7..6..5..4..3..2..1	Cramped
Obsolete	7..6..5..4..3..2..1	Up-to-Date
Low Status	7..6..5..4..3..2..1	Prestigious
Useful	7..6..5..4..3..2..1	Useless
Beautiful	7..6..5..4..3..2..1	Ugly
Environmentally Appropriate	7..6..5..4..3..2..1	Environmentally Inappropriate
Easy to Clean	7..6..5..4..3..2..1	Difficult to Clean
Boring	7..6..5..4..3..2..1	Exciting

How Familiar are you with this type of house?
Never seen one ❑ I've seen one ❑ Know them well ❑
Occupied one in the past ❑ Occupy one now ❑

When complete, please return the survey form using the attached Freepost envelope:
Thank you for your interest and assistance. Feel free to include any other comments.

4.4 Data Analysis

4.4.1. Overall Process

Generally, the survey process functioned well. The forms were easily understood, even by frail elderly respondents with multiple infirmities, who made reasonable responses, although often to rather few photographs. The semantic differential scales proved to be readily understood by virtually all respondents.

Very few people declined interviews. The usual excuse was that they were old and 'knew nothing about housing' - the interviewer should 'go and speak to some architects' to find out about housing. This may reflect a willingness of older age cohorts to assign responsibility for decisions to specialists, perhaps having little faith in the relevance of their own judgements.

The responses of the very oldest individuals supported the use of a cross-sectional study to probe the preferences and attitudes of past generations. Verbally, some of the oldest respondents could recall in detail their housing experiences during their family formation period - even though they may have exhibited symptoms of short-term memory loss and confusion about their current environments.

4.4.2 Response Rates

Responses were obtained from 802 subjects, who yielded a total of 6,206 individual analyses of houses. Of the judgements, 2,745 (260 subjects) came from interview settings, and 3,461 (542 subjects) came from mail-back surveys. The response detail is included as Exhibit 4.11.

Exhibit 4.11: Numbers of respondents by age and occupational groups

NUMBER OF RESPONDENTS

	AGE GROUPS						
	<20	20-34	35-59	60-69	>70	Missing	Total
1 High achievers		7	15	3	1		26
2 Service		85	144	31	26		286
3 Intermediate		34	74	15	18		141
4 Working class		31	83	27	39		180
6 Student	64	20	0	0	0		84
7 Artists		11	16	1	0		28
9 Housewives & Various		2	10	16	20		48
Missing						9	9
	64	190	342	93	104	9	802

Gender	<20	20-34	35-59	60-69	>70	Missing	Total
Male	23	63	146	41	39		312
Female	40	126	193	52	65		476
Unknown	1	1	3			9	14
% Male	35.9%	33.2%	42.7%	44.1%	37.5%		38.9%
% Female	62.5%	66.3%	56.4%	55.9%	62.5%		59.4%

Composition of Age Groups by Main Occupational Classification: Respondents				
	AGE GROUPS			
	20-34	35-59	60-69	>70
High achievers	3.68%	4.39%	3.23%	0.96%
Service	44.74%	42.11%	33.33%	25.00%
Intermediate	17.89%	21.64%	16.13%	17.31%
Working class	16.32%	24.27%	29.03%	37.50%
Other	17.37%	7.60%	18.28%	19.23%
% of Total	100.0%	100.0%	100.0%	100.0%

Exhibit 4.12 shows the numbers of individual house assessments obtained from the various respondent groups, showing the target minimum of 100 individual assessments in each key age/occupational group.

Exhibit 4.12: Numbers of Individual house assessments by age and occupational groups

NUMBER OF INDIVIDUAL ASSESSMENTS							
	AGE GROUPS						
	<20	20-34	35-59	60-69	>70	Missing	Total
1 High achievers		40	116	39	6		201
2 Service		652	1,088	212	168		2,120
3 Intermediate		270	533	102	116		1,021
4 Working class		220	529	248	331		1,328
6 Student	857	130	0	0	0		987
7 Artists		58	132	6	0		196
9 Unknown & other		18	53	109	123		303
Missing						50	50
	857	1,388	2,451	716	744	0	6,206
Gender	<20	20-34	35-59	60-69	>70	Missing	Total
Male	314	522	1,084	284	302		2,506
Female	308	866	1,367	432	442		3,415
Unknown	6	6	18	0	0	28	
% Male	36.6%	37.6%	44.2%	39.7%	40.6%		40.4%
% Female	35.9%	62.4%	55.8%	60.3%	59.4%		55.0%

Composition of Age Groups by Main Occupational Classification: Individual Assessments				
	AGE GROUPS			
	20-34	35-59	60-69	>70
High achievers	2.88%	4.73%	5.45%	0.81%
Service	46.97%	44.39%	29.61%	22.58%
Intermediate	19.45%	21.75%	14.25%	15.59%
Working class	15.85%	21.58%	34.64%	44.49%
	85.16%	92.45%	83.94%	83.47%

The geographical distribution is included as Exhibit 4.13.

Exhibit 4.13 Geographical distribution of responses

GEOGRAPHICAL DISTRIBUTION OF RESPONSES

Current Abode

	Respondents	Individual Assessments	% of Respondents	% of Assessments
Cambridge	448	3,726	55.86%	60.04%
Cambs Villages	67	605	8.35%	9.75%
Cambridge Area	18	234	2.24%	3.77%
Bury St.Edmunds	39	228	4.86%	3.67%
Thetford	8	46	1.00%	0.74%
Bedford	71	416	8.85%	6.70%
Peterborough	16	77	2.00%	1.24%
Haverhill	27	152	3.37%	2.45%
Ely	46	277	5.74%	4.46%
Royston	15	90	1.87%	1.45%
Newmarket	37	222	4.61%	3.58%
Canadian	6	55	0.75%	0.89%
German	3	43	0.37%	0.69%
Other England	1	35	0.12%	0.56%
Total	802	6,206	100.00%	100.00%

In the mailback distribution stage, response rates varied dramatically (Exhibit 4.14). Responses rates appeared to be correlated with the socio-economic character of areas, and the proportion of rental stock. Areas of owner-occupied houses in well-maintained Postwar suburbs, exhibited response rates up to 60 per cent. In contrast, in the Abbey Farm Estate in Thetford, most of which remains housing association rental, the response rate was 3.8 per cent. In the Conservation Area survey (Chapter 5), it was calculated that the response rate for owner-occupiers was approximately 2.6 times that of renters. Renters can readily change dwellings, and are in a poor position to undertake improvements, and may have weaker opinions about the meaning of owner-occupied houses. Even council-built areas which have had much recent privatisation had low response rates, which suggests that the level of interest expressed by home-owners takes time to emerge.

Concentrations of functional illiteracy may also account for varying response rates. An inability to complete forms was confirmed in discussion with local authority and housing association managers. One local authority recognising the problems many of their tenants had in dealing with questionnaires and printed information, had a policy of interviewing all of their tenants annually, to ensure that they knew about their rights and responsibilities as tenants, and were receiving all of the social benefits to which they were entitled.

There were also indications that some population groups may regard the survey as irrelevant or devoid of meaning. Goodchild (1974, p.159) found in his experiments that “an environmental or visual urban image” was of most relevance to middle-class subjects. That some consumer groups might hold little opinion about the subjective aspects of houses is also supported by reactions from

certain individuals from other countries. Four older American academics, upon being given the questionnaire (before a university lecture), became abusive, apparently because, lacking insights into housing in the East of England, could offer no meaningful response. Similar experimental methodologies have successfully been used in the United States using American building forms. Kaplan and Kaplan (1989, p.51) proposed that hostility is one result of an inability to understand what is otherwise relevant material.

Non-response is a possible threat to internal validity of the survey. Given the need to achieve minimum numbers of respondents in various age/occupational groupings, the survey process was continued until adequate numbers appeared. This may mean that the process may have captured individuals in the low response groups with characteristics most similar to those in higher responding groups. This would tend to cause underestimation of differences between groups (Goodchild, 1974, p.167). However, this bias is essentially inescapable because it is difficult to compel responses from real consumers.

Exhibit 4.14 Distribution and returns of mail-back surveys

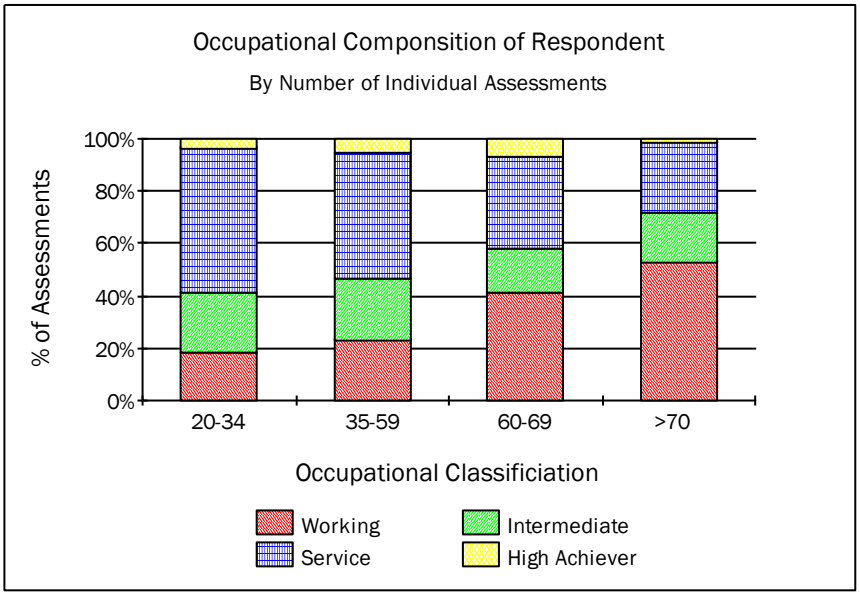
Distribution and Returns of Mail-back Surveys Summary			
City	No Distributed	No Returned	% Returned
Cambridge and Villages	1200	283	23.6%
Bury St.Edmunds	239	39	16.3%
Peterborough	60	16	26.7%
Bedford	319	71	22.3%
Thetford	119	8	6.7%
Haverhill	140	29	20.7%
Ely	176	44	25.0%
Royston	80	15	18.8%
New market	180	37	20.6%
Total	2513	542	21.6%

4.4.3. Responses by Occupational Groupings

It is to be expected that other variables than age group are of consequence, in particular those based on socio-economic factors. In particular, occupational composition of respondents by age cohort has changed with deindustrialisation: the number of individual assessments received corresponds to increasing 'service' employment (Exhibit 4.15). For example, nationally, between 1978 and 1997 the proportion of the working population in 'financial and business services' has risen from 9.8 per cent to 17.5 per cent, while those engaged in manufacturing fell from 29.6 per cent to 18.1 per cent (Social Trends, 28, The Office for National Statistics, 1998).

Increasing non-manual occupations, may account for some changes in demand for individual house types. Accordingly, an overview by age groupings and overall scores alone is incomplete, and, while giving reasonable representations of the overall market, may, due to the aggregation of different socio-economic groups, yield erroneous impressions into how demand characteristics have evolved.

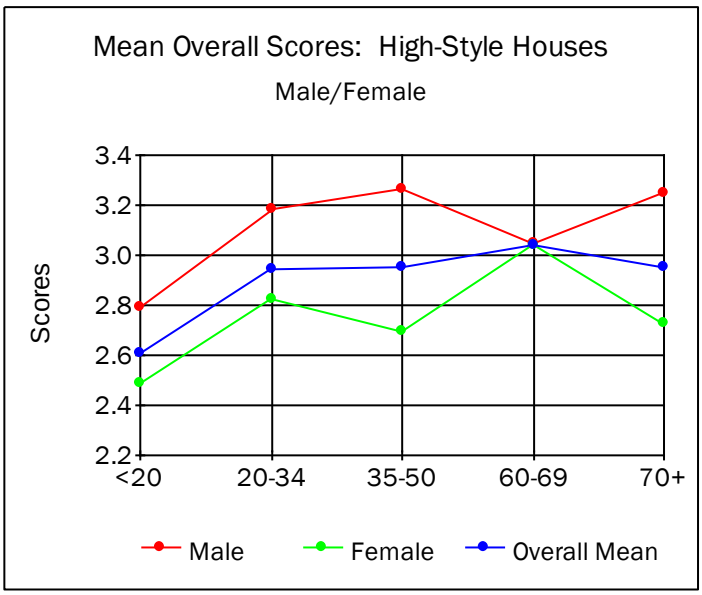
Exhibit 4.15: Individual assessments classified by age and occupation (chart)



4.4.4. Gender

Few statistically significant gender differences were noted. Factor analysis failed to suggest any meaningful difference in the way in which comparable groups of males and females structured their responses, nor did an analysis of variance of overall scores or individual adjectives, with one exception. For all age groups, for High-Style houses, the overall scores were higher from the males than the females, except for the 60-69 group (Exhibit 4.16).

Exhibit 4.16: Differences in overall scores for High-Style houses by gender



Consideration of the differences by adjective category for the various house types revealed few significant differences. T tests were performed on the individual adjectives, as used by males and

females of different age groups: the largest degrees of significant differences found are summarised in Exhibit 4.17. It should be cautioned that given tests on numerous variables, it is likely that some significant results will be found.

Exhibit 4.17: Significant differences in use of adjectives between genders

Signficant Differences
T Test (equal variance not assumed)

Victorian Houses

Age Group	35-59	70+
Adjective	Interesting	Useful
t	-2.057	-2.161
df	238	54
sig.	0.041	0.035
Male Score	4.563	4.606
Female Score	4.929	4.688

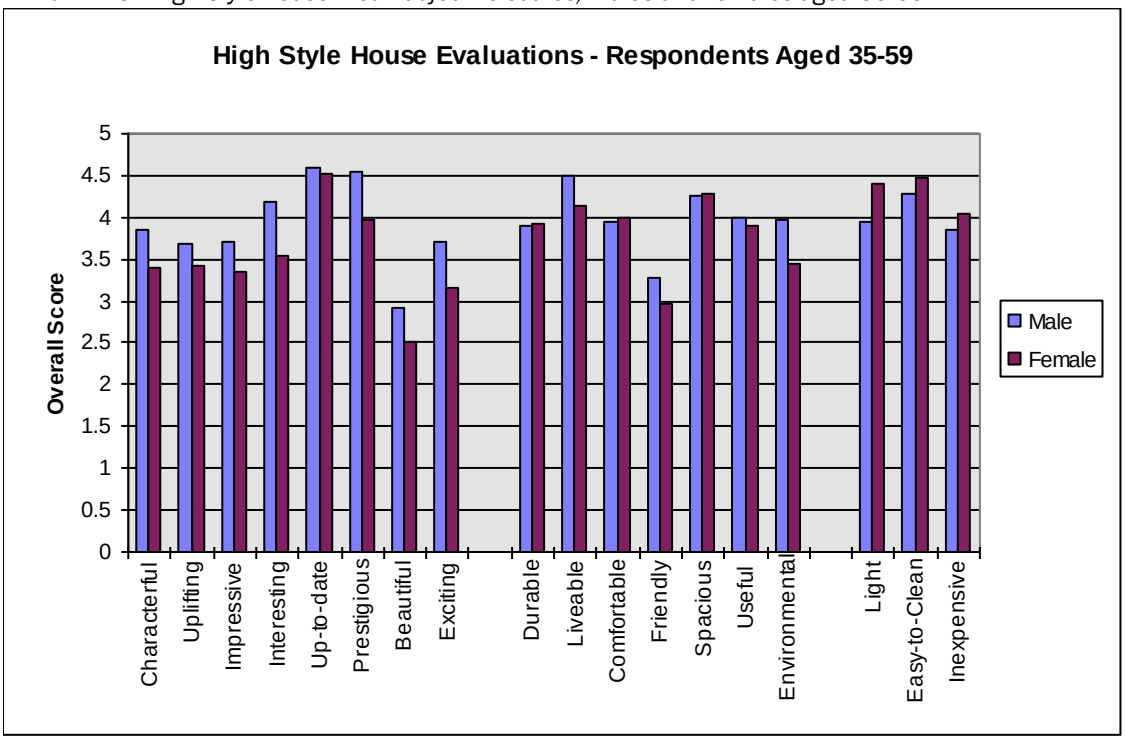
High-Style Houses

Age Group	35-59	35-59	35-59	70+
Adjective	Interesting	Prestigious	Environmental	Easy-to-Clean
t	2.423	2.312	2.058	-2.802
df	235	218	167	62
sig.	0.016	0.022	0.041	0.007
Male Score	4.20	4.54	3.97	4.8
Female Score	3.54	3.98	3.45	5.5135

Exhibit 4.18 shows that in all socio-aesthetic categories for High-Style houses, for respondents aged 35-59, males provided higher scores than females. However for cleanliness and lightness, females ranked the High-Style houses higher than males.

Tognoli (1987, p.661) referenced various studies which found differences in the way males and females relate to environments. Czikszentmihalyi and Rochberg-Halton (1981, p.131) found that men assessed houses largely in a physical sense, while women saw them more emotionally, something not evident in this data, in any age group. It is possible that in the case of very familiar house exteriors both genders offer the same interpretation, while faced with new buildings, differences appear.

Exhibit 4.18: High-Style house mean adjective scores, Males and females aged 35-59



4.4.5. Identification of House Dates of Construction

American house response studies, motivated by design review considerations, have often focussed on their suburban house types (Colonial, Mediterranean, Tudor,...). In the Cambridge-centred area, differences in housing form tend to relate to the age of the dwelling, various eras being characterised by the mass construction of a limited number of standard types, with limited addition of superficial 'style'. To determine the general awareness of the respondents to the nature of the available housing stock, 75 of the earliest surveys asked the respondents to date the houses in the photographs. They made a total of 988 individual dwelling age estimates (Exhibit 4.19).

Exhibit 4.19: Estimates of house ages: Number of subjects and judgements made

Age Group	No. of Subjects	Judgements Made
Under 20	10	138
20-39	20	280
40-59	22	339
60-79	9	124
80+	14	107
Total:	75	988

Subjects were asked to assign the various houses to one of a set of eras. The responses are summarised in Exhibit 4.20.

Exhibit 4.20: House age estimates

All Respondents

	HOUSE TYPES					
Estimated Era of Construction	Victorian/ Edwardian	Interwar Builder	50-70s Developer	80-90s Developer	Reproduction Victorian	High-Style
pre 1800	0.0%	0.0%	0.0%	0.8%	0.8%	0.0%
1800-1850	3.4%	0.0%	0.0%	0.0%	0.0%	0.0%
1851-1900	37.2%	0.9%	0.7%	0.0%	5.6%	0.6%
1901-1925	37.2%	7.3%	0.0%	2.3%	11.1%	3.9%
1926-1950	17.9%	60.0%	6.6%	3.1%	13.5%	4.4%
1951-1970	2.1%	27.3%	52.3%	7.7%	11.1%	26.5%
1971-1988	1.4%	3.6%	36.4%	23.8%	21.4%	40.9%
1989-1999	0.7%	0.9%	4.0%	62.3%	36.5%	23.8%
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Percent 'Feasible'	77.9%	67.3%	88.7%	86.2%	57.9%	?
Total Observations	110	110	110	110	110	110

The date ranges offered did not correspond to points of major change in house building forms, and there is no clear demarcation between houses built in 1970 and 1971, so the responses were assessed according to the percentage of 'feasible' responses. The criteria for feasibility was that the house had been assigned to the appropriate era, or to an adjacent era in which some examples of the house types had been constructed. Exhibit 4.21 shows that the levels of 'feasibility' were generally quite high, but fell for the oldest individuals.

Exhibit 4.21: House ages: Percentage feasible responses

Respondent Age Group	Victorian/ Edwardian	Interwar Builder	50-70s Developer	80-90s Developer	Reproduction Victorian	High-Style	MEAN
<20	70.0%	75.0%	95.0%	93.3%	70.0%	N/A	80.7%
20-39	83.3%	83.9%	97.9%	90.5%	51.2%	N/A	81.4%
40-59	89.1%	76.7%	94.1%	92.1%	60.0%	N/A	82.4%
60-79	72.7%	63.6%	81.3%	100.0%	60.0%	N/A	75.5%
80+	39.1%	50.0%	40.0%	21.4%	54.5%	N/A	41.0%

It was apparent that most active consumers could distinguish house ages and could detect reproductions. While few people in any age group thought the Victorian houses could be new, few thought the reproductions could be old. While it appears that the over 80s were more capable of assigning a proper era to Reproduction Victorians than the authentic Victorians, this group tended to believe all house types were newer than they were.

Although some of the sample 80-90s builder suburban houses tend to have forms and details which might be considered to be somewhat historic in nature, they were also recognised as new. Except for the over 80 group, very few individuals thought that they could be anything but quite recent.

It is clear that the over 80s had the greatest difficulty placing the buildings in time. As some of the people who were interviewed had obvious problems with their temporal frameworks, this might be expected. However, in an interview setting, it was apparent that even the more confused subjects could associate the appropriate house types with events in their lives.

The dating of the High-Style houses (Exhibit 4.22) was, as might be expected, somewhat erratic. Although all of the houses were under thirty years old, they were frequently assigned to much earlier periods. Almost twenty per cent of the 80+ group assigned them to the interwar period, in particular those houses which were white, and somewhat 'international style'. It is interesting to reflect that High-Style houses would have been new, exotic, and exciting when today's over-eighties were children.

Exhibit 4.22: High-Style houses: Estimated era of construction

Estimated Era of Construction	All Respondents	AGE OF RESPONDENT <20	20-39	40-59	60-79	80+
pre 1800	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1800-1850	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1851-1900	0.6%	0.0%	1.7%	0.0%	0.0%	0.0%
1901-1925	3.9%	3.4%	1.7%	1.6%	17.6%	6.3%
1926-1950	4.4%	0.0%	5.1%	1.6%	5.9%	18.8%
1951-1970	26.5%	48.3%	28.8%	22.6%	5.9%	18.8%
1971-1988	40.9%	37.9%	44.1%	41.9%	35.3%	31.3%
1989-99	23.8%	10.3%	18.6%	32.3%	35.3%	25.0%

Questions about house age were removed from subsequent surveys. The results indicate that consumers, aged under 80, are quite knowledgeable about the age of houses, and most can detect even good quality reproduction houses. High-style houses fall outside of the framework, and, generally, people found them more difficult to place in time.

4.4.6. Overall Scores

(a) Overall Scores by Age Groups

In response to the question "Please indicate the overall rating you would assign to each, as a place in which you would like to live", a total of 592 respondents provided a total of 4,144 overall scores. The means, standard deviations, and confidence limits for these scores, by age group and house type, are shown in table form (Exhibit 4.23), and as a graph (Exhibit 4.24). One-way Analysis of Variance has been used to confirm that apparent differences between evaluations are statistically significant.

A number of observations might be made. Firstly, the range of opinion varied between groups. In particular, those aged 50 to 79, with the exception of the 80-90s developer and the high-style houses, differentiated between the desirability of the houses to a lesser extent than those either older or younger. The analysis of variance between the house types for the various age groups indicated that all distinguished between the house types. However, in the case of the 60-69 group, if the High-Style and 80-90s Builders are not included, no significant difference was shown in their scores of the various house types: the reason can be seen on Exhibit 4.24.

Generally, statistically significant differences were noted in the way different age groups perceived the different houses, except for the High-Style houses and the Interwar Council houses with replaced windows, which tended to receive low scores.

The Victorian houses were typically assigned very low scores by the older groups, but successively younger groups assigned them higher rankings, including a clear first place among the 20-49 age groups, the current primary house consumers. The low esteem for Victorian houses among respondents under age 20 might signify that pre-consumers do not reflect more informed, mature preferences, or that they are reacting against the style choice of their parents.

The Interwar Builder houses received a high ranking from the over 80 group: a few of the oldest respondents had bought such houses new, and to them, the houses retained their desirability. Interwar houses generally fell in rank through progressively younger age groups.

The Interwar Council-built houses were generally ranked quite high. The 70-79 group ranked them in first position of the products available to them when they were younger, and they had second place among the 20-39 age groups. Comments made during the interview process suggest why. The oldest respondents regarded these houses as a vast improvement over what existed before the First War - typically the stock in which they were brought up. When probed further, the first reaction of respondents in their 50s and 60s, was that such houses are council stock, and although seen of good quality, were less desirable than houses built for owner-occupation. Younger groups were progressively less aware that these were council built. Among the under 30s it was apparent from interview comments, that few knew these were council built, so they apparently judged them on visual attributes alone.

The Postwar (50-70s) builder houses scored reasonably well among consumers over 60 (those generations that created and first occupied them), but received very low scores from all younger groups.

The house type now commonly built by builders (80-90s), ranked as a clear first among the older groups, but fell among the 30-39 age cohort, before rising to first place among the under twenties. However, there is considerable disagreement among the younger consumers, as may be noted by the above-average standard deviations among some of the age cohorts, which is explained later in terms of occupational classification.

(b) Overall Scores by Occupational Groupings:

Exhibits 4.25, 4.26, and 4.27 explore overall scores on the basis of occupation. Exhibit 4.25 shows 278 respondents aged 35-59, who scored a total of 1,890 house photographs, on the basis of the main occupational groups. All groups ranked Victorian houses very high. The 80-90s Builder houses were highly scored by the 'intermediate' (second place) and 'working' (first place) groups, but lower among the 'service' group (fourth place) and the 'high achievers' (third place). The Interwar Council-built houses were among the top three choices for all groups (first place for the 'high achievers' and 'intermediate'), except the 'working' group, who placed them fifth. The Interwar Builder houses were ranked lower by the 'service' and 'high achiever' groups than by the others, although those with replaced windows were ranked third overall by the 'artists'. The analysis of variance suggests that occupational difference is more important for interpretations of some houses than others. Occupational differences were significant for overall evaluations of the Interwar Builder houses, the 80-90s Builder houses, and the Interwar Council houses with authentic windows. Other types were characterised by more uniform judgements: this age group all esteemed Victorian houses and Reproductions and uniformly disliked 50-70s Builder houses, High-Style houses, and Interwar Council-Built houses with replaced windows.

Service Occupations

Exhibit 4.26 summarises responses from different age groups with 'service' occupations. The rise in esteem of the Victorians and Victorian Reproductions among the younger groups is very clear. While the 70+ group placed authentic Victorians fourth, the consumers aged under 60 ranked it as a clear first. Conversely, the 50-70s Builder houses fell from third place among the 70+ group to last place among those aged under 60. The high esteem of the Interwar Council houses is shown by the 70+ group ranking them in first place. The 80-90s Builder houses were ranked very highly by the older groups (placed first by the 60-69 group), but received relatively lower scores among the younger groups, and fell to fifth place among the 30-34 group. Some caution in these results should be observed to the over 70 group - 'service' occupations are relatively uncommon among the oldest groups, so there are only 67 evaluations in this sub-category.

Working Occupations

Exhibit 4.27 shows scores for 'working' groups of different ages. Again significant differences emerge for many of the house types, showing an evolution of preferences. This can be contrasted with Exhibit 4.26 to observe the different scores given to the houses by the different occupational groups. Again, the Victorian houses are scored higher by the younger 'workers', however the different responses among the 60-69 group might be noted: while the 'service' group ranked them second, the 'working' group placed them seventh, indicating that the 'service' group may have set a trend, which was subsequently followed by 'workers'. The Interwar Builder houses were more esteemed among the older 'working' groups: those aged 70+ placed those with replaced windows in second place, they fell to sixth place among the 20-34 'workers'. The 35-59 'working' group scored the 80-90s Builder houses well ahead of any other type, which is in contrast to the 'Service' groups, who placed them third. Again, the leadership of the 'service' group can be noted: while the 35-59 'service' group had moved such houses to third place, the 'workers' kept them first: however the 20-34 'workers reduced them to third, while the 'service' group of that age cohort moved them to fifth. The esteem in which the Interwar Council houses were held by the 'service' respondents is not shared by the 'working' group: while the 70+ 'service' group placed them first, their 'working' equivalents ranked them fifth. Perhaps the significance of the original tenure form is greater for the 'working' group, some of whom would have been council renters, in contrast to the 'service' group, who are more likely to have been owner-occupants.

In both 'service' and 'working' groups, the Interwar Council with replaced windows, and the 'High-Style' houses were apparently both uniformly disliked.

This consideration of overall scores shows that both age cohort and occupation relate to how groups of consumers assess houses.

Exhibit 4.23: Overall scores by age group for different house types, and confidence limits

OVERALL SCORES BY AGE GROUP

HOUSE TYPE		AGE GROUP <20	20-29	30-39	40-49	50-59	60-69	70-79	80+	Evaluations Total N=	ANOVA df=between groups/ within groups	
Victorian	Mean	3.22	5.11	5.23	4.97	4.22	3.94	3.70	3.63		F=	19.416
	N=	105	61	161	115	107	79	33	35	696	df	7 / 688
	Standard Deviation	1.62	1.74	1.37	1.52	1.64	1.64	1.74	1.54		sig<	0.000
InterwarBuilder (a)	Mean	3.55	3.93	4.15	3.65	4.04	4.07	4.04	4.68		F=	2.096
(original windows)	N=	55	43	112	82	67	56	25	22	462	df	7 / 454
	Standard Deviation	1.99	1.50	1.54	1.61	1.50	1.45	1.81	1.21		sig=	0.049
InterwarBldr (b)	Mean	3.11	3.74	3.73	3.21	3.70	4.20	4.50	5.67		F=	3.697
(replaced windows)	N=	55	19	45	28	37	25	8	6	223	df	7 / 215
	Standard Deviation	1.17	1.52	1.42	1.64	1.65	1.58	1.77	1.03		sig<	0.000
Intewar Builder (a+b)	Mean	3.33	3.78	4.02	3.54	3.90	4.11	4.13	4.90		F=	4.789
(both types)	N=	110	62	157	110	104	81	33	28	685	df	7 / 677
	Standard Deviation	1.83	1.50	1.52	1.62	1.57	1.48	1.81	1.18		sig<	0.000
50-70s Builder	Mean	2.77	2.83	2.84	2.71	3.19	3.91	4.17	4.38		F=	7.900
	N=	105	58	116	90	93	54	30	26	572	df	7 / 564
	Standard Deviation	1.27	1.56	1.38	1.57	1.75	1.31	1.42	1.79		sig<	0.000
80-90s Builder	Mean	4.97	4.73	4.21	4.54	4.71	5.09	5.10	5.38		F=	4.341
	N=	114	44	123	91	76	58	20	21	547	df	7 / 539
	Standard Deviation	1.42	1.68	1.83	1.61	1.82	1.66	1.59	1.12		sig<	0.000
Victorian Reproduction	Mean	4.60	4.73	4.63	4.57	3.93	4.17	4.00	3.36		F=	2.801
	N=	20	44	126	77	84	58	23	22	454	df	7 / 446
	Standard Deviation	1.10	1.73	1.48	1.44	1.45	1.45	1.71	1.43		sig=	0.002
High Style	Mean	2.62	2.91	2.92	2.80	3.03	3.03	3.29	2.74		F=	1.138
	N=	163	79	224	152	144	100	35	42	939	df	7 / 931
	Standard Deviation	1.83	1.74	1.87	1.77	1.96	1.76	2.01	1.79		sig=	0.330
Interwar Council (a)	Mean	3.82	4.79	5.06	4.40	4.07	3.89	4.67	4.49		F=	2.611
(original windows)	N=	44	24	53	42	36	38	15	14	266	df	7 / 258
	Standard Deviation	1.30	1.79	1.28	1.75	1.84	1.69	1.63	1.67		sig=	0.005
Interwar Council (b)	Mean	3.63	2.73	3.37	2.72	3.39	3.13	2.91	4.20		F=	1.575
(replaced windows)	N=	43	22	38	36	28	23	11	4	205	df	7 / 197
	Standard Deviation	1.11	1.20	1.53	1.45	1.73	1.52	1.22	0.58		sig=	0.125
Interwar Council (a+b)	Mean	3.72	3.80	4.45	3.63	3.77	3.61	4.00	4.42		F=	1.480
(both types)	N=	87	46	91	78	64	61	26	18	471	df	7 / 463
	Standard Deviation	1.21	1.85	1.62	1.82	1.83	1.66	1.68	1.46		sig=	0.114
Overall	Mean	3.48	3.90	3.962	3.76	3.77	3.91	3.98	3.89			
(incl Misc)	N (observations)=	748	400	665	721	694	518	200	198	4,144		
	Standard Deviation	1.68	1.88	1.82	1.84	1.81	1.68	1.77	1.74			
Mean of Std Deviations (not incl High-Style)		1.218	1.414	1.313	1.399	1.487	1.367	1.432	1.152			
										Respondents		
Total Number of Respondents		54	58	151	107	96	67	34	25	592		
	ANOVA F=	26.908	14.069	35.188	25.019	8.073	7.880	2.896	7.033			
	df=	9 / 736	9 / 390	9 / 655	9 / 711	9 / 684	9 / 508	9 / 190	9 / 188			
	sig=	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.000			

90 per cent confidence limits for overall scores by age group for different house types.

HOUSE TYPE		AGE GROUP <20	20-29	30-39	40-49	50-59	60-69	70-79	80+
Victorian	Upper Limit	3.53	5.55	5.44	5.25	4.53	4.30	4.29	4.14
	Mean	3.22	5.11	5.23	4.97	4.22	3.94	3.70	3.63
	Lower Limit	2.91	4.68	5.02	4.70	3.90	3.57	3.10	3.12
InterwarBuilder (a)	Upper Limit	3.70	4.15	4.26	3.85	4.18	4.43	4.74	5.35
	Mean	3.33	3.78	4.02	3.54	3.90	4.11	4.13	4.90
	Lower Limit	2.96	3.41	3.78	3.24	3.61	3.80	3.51	4.45
Postwar (50-70s)	Upper Limit	3.01	3.23	3.09	3.04	3.55	4.26	4.67	5.07
	Mean	2.77	2.83	2.84	2.71	3.19	3.91	4.17	4.38
	Lower Limit	2.53	2.43	2.59	2.39	2.84	3.56	3.66	3.70
80-90s Builder	Upper Limit	5.23	5.22	4.53	4.87	5.12	5.51	5.80	5.86
	Mean	4.97	4.73	4.21	4.54	4.71	5.09	5.10	5.38
	Lower Limit	4.71	4.23	3.89	4.21	4.30	4.66	4.40	4.90
Victorian Repro	Upper Limit	5.08	5.24	4.89	4.89	4.24	4.55	4.70	3.96
	Mean	4.60	4.73	4.63	4.57	3.93	4.17	4.00	3.36
	Lower Limit	4.12	4.22	4.38	4.25	3.62	3.80	3.30	2.77
High Style	Upper Limit	2.90	3.30	3.17	3.08	3.36	3.38	3.95	3.28
	Mean	2.62	2.91	2.92	2.80	3.03	3.03	3.29	2.74
	Lower Limit	2.34	2.53	2.68	2.52	2.71	2.68	2.62	2.20
Interwar Council (a)	Upper Limit	4.20	5.51	5.40	4.94	4.67	4.43	5.49	5.36
	Mean	3.82	4.79	5.06	4.40	4.07	3.89	4.67	4.49
	Lower Limit	3.43	4.07	4.71	3.87	3.46	3.36	3.84	3.61

Exhibit 4.23 (continued)

Exhibit 4.24: Chart of mean overall scores for different house types, by respondent age

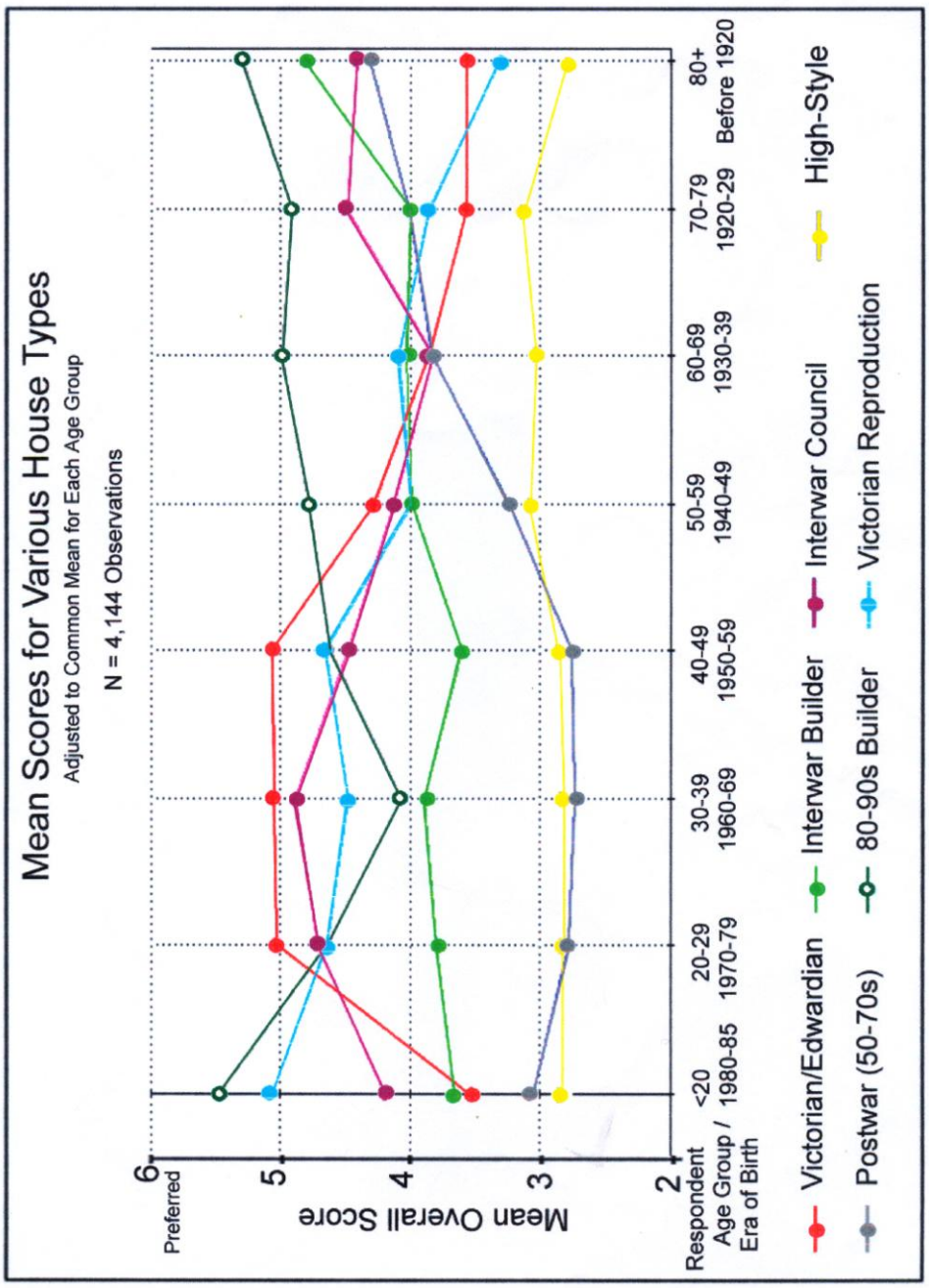


Exhibit 4.25: Overall scores by occupational classification for respondents aged 35-59

AGE 35-59		Three top ranked in each group underlined.						ANOVA (without artists)	
		OCCUPATIONAL CLASSIFICATION							
HOUSE TYPE		HighAcheiver I	Service I+II	Intermediate III	Working IV-VII	Artist	Evaluations Total N=	df= between groups / within groups	
Victorian	Mean	4.77	4.83	4.81	4.53	4.94		F=	0.831
	N=	13	132	70	70	16	301	df	3 / 281
	Standard Deviation	1.48	1.49	1.54	1.63	1.77		sig=	0.478
InterwarBuilder (a)	Mean	3.29	3.67	4.09	4.51	3.75		F=	3.082
	N=	7	89	53	49	12	210	df	3 / 194
	Standard Deviation	0.95	1.59	1.64	1.39	1.42		sig=	0.029
InterwarBldr (b)	Mean	2.67	3.15	4.12	4.00	3.80		F=	3.857
	N=	6	39	17	20	5	87	df	3 / 78
	Standard Deviation	1.21	1.61	1.66	1.34	1.79		sig=	0.013
Postwar 50-70s	Mean	2.60	2.73	3.15	3.21	2.29		F=	1.584
	N=	10	106	59	47	14	236	df	3 / 218
	Standard Deviation	1.07	1.60	1.60	1.69	1.14		sig=	0.194
80-90s Builder	Mean	4.00	4.27	5.18	5.33	3.00		F=	5.885
	N=	8	112	51	46	13	230	df	3 / 213
	Standard Deviation	1.69	1.64	1.50	1.53	1.58		sig=	0.001
Victorian Repro	Mean	3.80	4.46	4.38	4.52	3.80		F=	0.701
	N=	10	102	48	52	10	222	df	3 / 208
	Standard Deviation	1.62	1.46	1.58	1.38	1.55		sig=	0.552
High Style	Mean	3.28	2.97	2.99	2.55	3.00		F=	1.678
	N=	18	182	94	96	20	410	df	3 / 386
	Standard Deviation	1.67	1.85	1.95	1.72	2.15		sig=	0.171
Interwar Council	Mean	4.83	4.41	5.22	4.41	4.00		F=	4.145
	N=	6	44	27	32	5	114	df	3 / 105
	Standard Deviation	1.72	1.68	1.34	1.68	2.35		sig=	0.008
Interwar Cncl (b)	Mean	1.00	3.00	3.04	2.93	3.00		F=	1.114
	N=	2	31	27	14	6	80	df	3 / 70
	Standard Deviation	0.00	1.37	1.85	1.38	1.77		sig=	0.349
Overall	Mean	3.80	3.78	4.04	3.89	3.40			
	N=	80	837	446	426	101	1,890		
	Standard Deviation	1.65	1.74	1.79	1.81	1.88			
							Respondents		
	Number of Respondents	12	120	64	69	13	278		
ANOVA	F=	3.417	20.669	13.728	15.528	2.523			
	df=	9 / 70	9 / 827	9 / 446	9 / 416	9 / 91			
	sig=	0.000	0.000	0.000	0.000	0.012			

Exhibit 4.26: Overall scores for service groups by main age cohorts

SERVICE GROUP

Three top ranked in each group underlined.

HOUSE TYPE		AGE COHORT 20-34	35-49	50-59	60-69	70+	Evaluations Total N=	ANOVA	
Victorian	Mean	5.52	5.11	4.31	4.55	3.58		F=	10.102
	N=	64	87	45	31	12	239	df	4 / 235
	Standard Deviation	1.25	1.38	1.53	1.63	1.24		sig<	0.000
InterwarBuilder (a)	Mean	4.02	3.67	3.64	3.90	3.27		F=	0.912
	N=	46	63	25	21	11	166	df	4 / 162
	Standard Deviation	1.39	1.60	1.60	1.26	1.35		sig=	0.458
InterwarBldr (b)	Mean	3.29	3.08	3.27	4.11	7.00		F=	3.109
	N=	17	24	15	9	1	66	df	4 / 62
	Standard Deviation	1.16	1.67	1.58	1.54			sig=	0.021
50-70s Builder	Mean	2.88	2.64	2.84	3.75	4.00		F=	5.580
	N=	58	67	38	28	9	200	df	4 / 197
	Standard Deviation	1.52	1.58	1.65	1.51	1.32		sig<	0.000
80-90s Builder	Mean	3.96	4.29	4.27	4.78	5.17		F=	1.287
	N=	52	80	33	18	6	189	df	4 / 183
	Standard Deviation	1.67	1.57	1.82	1.77	2.14		sig=	0.277
Victorian Reproduction	Mean	4.86	4.69	3.97	4.29	2.86		F=	2.989
	N=	42	67	36	21	7	173	df	4 / 168
	Standard Deviation	1.47	1.35	1.59	1.68	1.46		sig=	0.020
High Style	Mean	3.08	2.94	3.08	3.06	3.64		F=	0.554
	N=	84	123	59	32	11	309	df	5 / 305
	Standard Deviation	1.80	1.85	1.91	1.41	1.80		sig=	0.735
Interwar Council	Mean	4.95	4.04	3.71	4.06	6.14		F=	2.476
	N=	20	26	17	16	7	86	df	4 / 83
	Standard Deviation	1.50	1.66	1.72	1.65	0.69		sig=	0.050
Interwar Cncl (b)	Mean	3.41	2.95	3.09	3.00	2.00		F=	0.861
	N=	22	20	11	9	3	65	df	4 / 60
	Standard Deviation	1.22	1.32	1.51	1.66	0.00		sig=	0.492
Overall	Mean	3.96	3.79	3.60	3.93	4.06			
	N=	405	557	279	185	67	1,493		
	Standard Deviation	1.77	1.81	1.76	1.63	1.77			
	ANOVA F=	17.163	19.18	3.28	3.174	3.880			
	df=	9 / 395	9/550	9/272	9 / 175	9 / 57			
	sig=	0.000	0.00	0.00	0.001	0.001			

RANKING OF OVERALL SCORES FOR SERVICE GROUPS, BY MAIN AGE COHORTS

SERVICE GROUPS

HOUSE TYPE	AGE COHORTS 20-34	35-49	50-59	60-69	70+
Victorian	1	1	1	2	5
InterwarBuilder (a)	4	5	5	6	6
InterwarBldr (b)	7	6	6	4	-
50-70s Builder	9	9	9	7	3
80-90s Builder	5	3	2	1	2
Victorian Reproduction	3	2	3	3	7
High Style	8	8	8	8	4
Interwar Council	2	4	4	5	1
Interwar Cncl (b)	6	7	7	9	8

Exhibit 4.27: Overall scores for working groups by main age cohorts

WORKING GROUPS — Three top ranked in each group underlined.

HOUSE TYPE		AGE COHORTS 20-34	35-49	50-59	60-69	70+	Evaluations Total N=	ANOVA df= between groups / within groups	
Victorian	Mean	4.86	4.87	4.03	3.18	3.68		F=	5.366
	N=	29	39	32	22	37	159	df	4 / 154
	Standard Deviation	2.03	1.56	1.66	1.36	1.56		sig=	0.000
InterwarBuilder (a)	Mean	3.22	4.63	4.15	4.36	5.00		F=	3.896
	N=	18	30	20	14	23	105	df	4 / 100
	Standard Deviation	1.86	1.40	1.53	1.65	1.24		sig=	0.006
InterwarBldr (b)	Mean	3.73	3.89	4.09	4.44	5.22		F=	1.222
	N=	11	9	11	9	9	49	df	4 / 44
	Standard Deviation	2.20	1.36	1.38	1.59	1.48		sig=	0.315
50-70s Builder	Mean	3.21	2.79	3.65	4.33	4.29		F=	4.154
	N=	24	24	23	21	31	123	df	4 / 118
	Standard Deviation	1.89	1.47	1.82	1.11	1.72		sig=	0.003
80-90s Builder	Mean	4.81	5.58	4.71	6.31	5.26		F=	2.783
	N=	16	24	24	16	23	103	df	4 / 98
	Standard Deviation	2.48	1.28	2.01	0.79	1.29		sig=	0.031
Victorian Repro	Mean	3.96	5.04	3.92	4.17	3.84		F=	3.301
	N=	24	28	24	18	25	119	df	4 / 114
	Standard Deviation	1.88	1.23	1.32	1.20	1.28		sig=	0.013
High Style	Mean	3.00	2.39	2.72	2.81	2.79		F=	0.719
	N=	39	54	43	31	42	209	df	43 / 204
	Standard Deviation	1.99	1.60	1.87	1.83	1.80		sig=	0.580
Interwar Council	Mean	5.36	4.67	4.07	3.45	3.88		F=	2.686
	N=	14	18	14	11	16	73	df	4 / 68
	Standard Deviation	1.50	1.50	1.90	1.86	1.59		sig=	0.038
Interwar Cncl (b)	Mean	3.29	2.63	3.00	2.43	3.63		F=	0.904
	N=	7	8	7	7	8	37	df	4 / 32
	Standard Deviation	1.89	1.06	1.83	0.98	1.06		sig=	0.473
Overall	Mean	3.85	4.02	3.77	3.95	4.00			
	N=	182	234	201	149	214	980		
	Standard Deviation	2.102	1.86	1.82	1.772	1.71			
	ANOVA F=	3.577	19.609	3.045	8.786	6.714			
	df=	9 / 172	8/225	9/191	9 / 139	9 / 204			
	sig=	0.000	0.000	0.002	0.000	0.000			

RANKING OF OVERALL SCORES FOR WORKING GROUP, BY MAIN AGE COHORTS

WORKING GROUPS

HOUSE TYPE	AGE COHORTS 20-34	35-49	50-59	60-69	70+
Victorian	2	3	5	7	7
InterwarBuilder (a)	8	5	2	3	3
InterwarBldr (b)	5	6	3	2	2
50-70s Builder	7	7	7	4	4
80-90s Builder	3	1	1	1	1
Victorian Repro	4	2	6	5	6
High Style	9	9	9	8	9
Interwar Council	1	4	4	6	5
Interwar Cncl (b)	6	8	8	9	8

4.4.7 Factor Analysis

While the simple overall scores are interesting, further insights into changing consumer opinion are more useful, in understanding how house value is assigned by consumers. Choice theory (Exhibit 3.3) suggests that It is necessary to both understand how houses are evaluated relative to important attributes, and how important each attribute is in formulating overall judgements. Accordingly, three areas require consideration:

(i) Possible differences in importance of the various major elements (dimensions) which contribute to overall opinion;
(ii) Possible differences in weightings (loadings) of the variables in composing the dimensions;
(iii) Possible differences in the assessments (scores) of the adjectives relative to the various house types.

Factor analysis can yield insights into the first two, as will consideration of specific adjective use by different groups for the third.

(a) Analysis of Responses

Exploratory factor analysis, using SPSS software, showed the emergence of three clear, robust dimensions which correspond to the underlying constructs by which the respondents assessed the various house types. The respondents revealed that their prime underlying judgements were what might be termed as 'socio-aesthetic', 'serviceability, and 'cleanliness, lightness, and modernness'. Exhibit 4.28 shows the composition of the three dimensions for respondents aged 20 and over. Factor analysis performed on the responses from various subgroups indicated that the overall structure did not change substantially with age or occupation, with the exception of respondents aged under 20 (Exhibits 4.29, 4,30, and 4.31).

While Canter (1974), and Hershberger (1970) identified such categories as 'Space-Evaluation', 'Organization', 'Potency', 'Novelty-Excitement' and 'Spaciousness', this experiment revealed a structure which created a division between an aesthetic/image evaluation and appraisals of functionality, much as suggested by Bonnes and Secchiaroli (1995, p.45) and Mann (1997). This more literal view of buildings may result from the nature of the respondents and the adjectives offered. From the earlier interviews, it was apparent that most subjects found adjective pairs which reflected only the socio-aesthetic aspects of the houses to be inadequate. Unlike studies which deal with either inexperienced housing consumers (undergraduates) or use non-residential buildings for stimuli (few people can exercise individual choice), in this study very real housing consumers chose from a set of available houses, which, for most respondents, included types they have actually occupied. The separation of different types of 'esteem' is expected: houses fill a simple role by providing basic utilitarian shelter, but also have a role in establishing status and reinforcing self-identity (Cooper, 1976 and Proshansky, 1983), and have a major financial impact on consumers.

(b) Differences in Weightings Given to Dimensions of Opinion by Age Groups

Analysis was also undertaken by age group. It was found that while the overall structure changed little, the percentage of the variance explained by the dimensions did (Exhibit 4.32). In particular, the 'cleanliness, lightness, and modernness' dimension was of greater relative importance to the older groups. Among the 20-34 age group it accounted for 7.99 per cent of overall variance, but 11.3 per cent among the 70+ group. Conversely, the importance of the socio-aesthetic factors was higher for the younger groups than the older groups (except for the pre-consumers, age <20). The 'serviceability' dimension did not show a strong trend by age group. This suggests that older groups express relatively more opinion about the objective standards of dwellings, in particular those associated with cleanliness and lightness, while younger groups' judgements are more oriented to subjective measures. Of course, this analysis related only the variance of the adjectives tested. As an extreme, an analysis with no adjectives dealing with, for example, 'cleanliness, lightness and modernness', would show that dimension accounting for none of the observed variance, even though it would remain an important element in establishing overall house evaluations.

(c) Composition of the Dimensions of Opinion by Age Group

Exhibit 4.29 shows the factor loadings and other data for the various age groups.

There were differences in the ways in which the different age groups created their evaluations. In general, all respondents created what can be termed a 'socio-aesthetic' dimension from the variables characterfulness, uplifting, impressive, interesting, prestigious, and exciting. For all but the under 20's, 'impressive/unimpressive' and 'exciting/boring' had the highest loadings on this dimension, suggesting that these are more important in evaluating this aspect of the worth of a house, than 'beautiful/ugly'. 'Beautiful/ugly' seemed to be an expression of overall evaluation (it was noted to have the highest correlation with the overall score), perhaps resulting from a haloing effect, whereby beauty is seen as summarising all the evaluations.

The pre-consumers (age<20) did not assemble the forms of evaluation as concisely as the older groups. In particular, what might be their 'socio-aesthetic' dimension was much less clear, as it included 'lightness', 'expensive to maintain', and 'usefulness', which other age groups more logically associated with other functional adjectives.

The consuming groups by age all associated 'durability', 'liveability', 'comfort', 'friendliness', and 'usefulness' with a 'serviceability' dimension. None of the groups associated 'spacious/cramped' in a major way in forming this dimension, although the 20-34 group put the most weight on it. This is quite understandable: the houses were in the same size range, and the survey instructions indicated that such was the case.

'Environmental appropriateness' loaded highest in 'serviceability'. It appears that people view it as a functional attribute of houses, and it showed limited association with the 'socio-aesthetic'. This variable was included as an emerging way in which people evaluate many consumer products and services (Assael, 1998, p.40-41). However, an analysis of variance of all respondents failed to find statistical significance between the environmental evaluations of the different house types. In the interview sessions, this was quite clear - frequently clarification of the term was requested. The response 'use it the way you think' typically elicited musings about the nature of environmental appropriateness. Younger people tended to see it in terms of energy consumption, while some older respondents interpreted it as the extent to which the house consumed countryside. Clearly further exploration of this variable is in order.

Among the oldest respondents, the 'cleanliness, lightness, and modernness' dimension (Exhibit 4.32) accounted for the largest proportion of overall variance, and these respondents also assigned the highest loadings to the individual variables to this category. In particular, the changes in certain loadings between the age groups are of interest, because they verify attitudes expressed in the interviews. Older subjects frequently commented on how light or bright they felt a house would be. Younger respondents assigned less importance to 'lightness', presumably taking inexpensive, adequate artificial light for granted, and perhaps not sharing the oldest cohorts' rejection of the cluttered, dark, and, frequently dirty, environments of their Victorian parents.

(d) Composition of the Dimensions of Opinion by Occupational Groups

Factor analysis was also conducted using age/occupational sub-groups, in particular for the respondents aged 35-59 and the 'working' occupations of the different age groups. The results are summarised in Exhibits 4.30 and 4.31 respectively. KMO sampling adequacy and Bartlett's test suggest these sub-groups are of adequate size, as did the literature review. Further sub-division of groups is possible, however the number of responses decreases with each division: in trials on still smaller groups, the test statistics fell substantially, suggesting that such analyses would lack robustness. While more responses can be gathered, members of some subsets are difficult to obtain; a major effort would be required to collect enough responses from managers and professionals aged over 70.

In order to ensure the analysis included the maximum possible number of evaluations, the three most recently added adjective pairs ('uplifting/depressing', 'liveable/uninhabitable', and 'spacious/cramped') were not used, reducing the adjective set from eighteen to fifteen.

Considering the importance of the dimensions, among the 35-59 group, there were distinct differences between how the variance is accounted for between the 'service' and 'working' groups (Exhibit 4.32). It can be seen the 'cleanliness and lightness' dimension is relatively less important for the 'service' groups than for the 'working and 'intermediate groups', and the 'socio-aesthetic' is more important. In particular, the 'cleanliness and lightness' dimension is more important than the 'serviceability' dimension for the 'working' group, emerging in second-place.

Among the 35-59 group, it is possible to see differences in the way evaluations are constructed, however there also is consistency (Exhibit 4.30). Differences include 'prestigious/low status', which was less important to the 'workers', and 'friendly/unfriendly' which was more important. Relative to the 'serviceability' dimension, the most interesting differences can be noted relative to the 'intermediate' group. They appeared to place greater significance, when compared with the 'service' and 'working' respondents, on 'comfort', 'friendliness', and 'usefulness'. Relative to 'lightness, cleanliness, and modernness', 'working' groups put more emphasis on 'easy-to-clean' and 'lightness'. The assessments of the sixteen 'artists' (93 evaluations) suggest that they evaluate houses in their own particular way, something which is not surprising, given previously referenced research.

If only 'working' groups are considered, ongoing change in the relative importance of the dimensions can again be noted (Exhibit 4.32). 'Cleanliness, lightness, and modernness' emerged as the first dimension for the 'working' group aged over 70, but it was of less importance to the younger cohorts. For the younger groups, a considerably greater amount of overall variance is accounted for by the 'socio-aesthetic' dimension, although 'serviceability' was the first dimension for the 20-34 'working' group, with 'socio-aesthetic' emerging in third place. With respect to the construction of the responses of the 'working' groups (Exhibit 4.31), there are some interesting aspects. In particular, among the 20-34 group, there was a very high loading of 'beautifulness' on the 'serviceability' dimension - suggesting a correlation with whether they felt the house was 'useful' or 'comfortable'. Relative to the 'clean and light' dimension, the disappearing importance of 'light/dark' can again be noted, together with an increase in how easy the house might be to clean, and, in particular, how expensive it might be to maintain. It might be argued that for the youngest 'workers' this is a different dimension of opinion, the issues of cost becoming very important. In contrast, for young consumers in 'service' occupations, 'easy-to-clean' had the highest loading on the 'lightness and cleanliness' dimension.

(e) Conclusion

The results of factor analysis suggest that the older cohorts, notably those of 'working' occupations, tend to evaluate houses on how they are perceived functionally, most particularly whether or not a house is considered to be 'clean and light'. Younger groups, evaluate more on the basis of whether a house is 'socio-aesthetically' desirable. The 'working' group aged 20-34 showed a very specific structure, dominated by matters of serviceability and maintenance costs, something which did not occur for the 'service' group of the same age group.

Exhibit 4.28: Factor analysis results for all subjects aged 20 and over

Principal Axis Factoring with Varimax Rotation

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.934
Bartlett's Test of Sphericity	Approx. Chi-Square	18,130.170
	df	153
	Sig.	0

Communalities	Initial	Extraction
Characterful	0.7015	0.7281
Light	0.2067	0.2346
Durable	0.3977	0.4298
Uplifting	0.5235	0.5095
Liveable	0.5132	0.5632
Impressive	0.6632	0.7191
Comfortable	0.5989	0.6380
Interesting	0.6856	0.6831
Inexpensive	0.2996	0.3377
Friendly	0.6228	0.6409
Spacious	0.3076	0.3028
Up-to-Date	0.3896	0.5035
Prestigious	0.5238	0.5334
Useful	0.4228	0.4742
Beautiful	0.6774	0.6944
Environmental Quality	0.4098	0.4026
EasyToClean	0.4128	0.5717
Exciting	0.6359	0.6839

Extraction Method: Principal Axis Factoring.

Total Variance Explained									
	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
Factor	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	7.5023	41.6794	41.6794	7.0935	39.4085	39.4085	4.3438	24.1324	24.1324
2	2.1598	11.9989	53.6782	1.6778	9.3209	48.7294	3.6342	20.1898	44.3222
3	1.3731	7.6283	61.3066	0.8793	4.8849	53.6143	1.6726	9.2922	53.6143
4	0.8310	4.6165	65.9230						
5	0.7531	4.1838	70.1069						

Rotated Factor Matrix

	Factor 1	Factor 2	Factor 3
	Socio-Aesthetic	Functionality: Servicability	Functionality: Cleanliness & Lightness
Characterful	**0.723**	0.426	
Light			0.417
Durable		**0.601**	
Uplifting	**0.632**	0.305	
Liveable		**0.699**	
Impressive	***0.799***		
Comfortable		***0.703***	
Interesting	***0.716***	0.412	
Inexpensive			**0.525**
Friendly	0.431	**0.671**	
Spacious		0.435	
Up-to-Date	0.395		**0.589**
Prestigious	**0.659**		
Useful		**0.623**	
Beautiful	**0.642**	**0.532**	
Environmental Quality		**0.514**	
EasyToClean			***0.715***
Exciting	***0.786***		

Loadings less than .3 not shown
Loadings >.5 underlined
Loadings >.7 underlined and italicised

Extraction Method: Principal Axis Factoring.
Rotation Method: Varimax with Kaiser Normalization.
Rotation converged in 7 iterations.

Exhibit 4.29: Composition of the dimensions of opinion by age group

Socio-Aesthetic Dimension

Rotated Factor Matrices

Principal axis factoring, Varimax Rotation

Loadings less than .3 not shown: loadings >.5 underlined, >.7 bolded and italicised

	AGE GROUPS				
	<20	20-34	35-59	60-69	>70
KMO sampling adequacy	0.916	0.926	0.934	0.909	0.766
Barlett's Test, Approx Chi-Square=	3,158.276	4848.109	9736.376	2310.682	1345.321
df=	153	153	153	153	153
sig=	0.000	0.000	0.000	0.000	0.000
Percent of Total Variance	19.880	24.892	24.184	22.109	19.574
(rotation sums of squared loadings)					*****
Characterful/Characterless		0.732	0.712	0.746	0.627
Light/Dark	0.537				
Transient/Durable	0.398				
Uplifting/Depressing	0.649	0.689	0.614	0.608	0.588
Liveable/Uninhabitable					
Impressive/Unimpressive	0.667	0.787	0.802	0.776	0.801
Comfortable/Uncomfortable					
Interesting/Uninteresting		0.623	0.721	0.693	0.612
Expensive/Inexpensive to maintain	0.580				
Friendly/Unfriendly	0.563	0.461	0.443	0.440	
Spacious/Cramped					
Up-to-date/Obsolete		0.453	0.342	0.399	0.450
Prestigious/Low status	0.736	0.637	0.673	0.595	0.677
Useful/Useless	0.529				
Beautiful/Ugly	0.551	0.645	0.655	0.610	0.509
Environmentally appropriate/Inappropriate		0.376	0.306		
Easy/Difficult to clean					
Exciting/Boring		0.792	0.771	0.758	0.785

***** Note: For this group socio-aesthetics emerged as the second dimension
<20 age group does not create the same structure as the other groups

Serviceability Dimension

Percent of Total Variance	22.303	21.057	20.658	19.919	19.818
(rotation sums of squared loadings)					
	AGE GROUPS			****	
	<20	20-34	35-59	60-69	>70
Characterful/Characterless	0.395	0.400	0.470	0.352	0.479
Light/Dark					
Transient/Durable	0.621	0.639	0.581	0.612	0.613
Uplifting/Depressing		0.373	0.359		
Liveable/Uninhabitable	0.730	0.676	0.716	0.712	0.656
Impressive/Unimpressive		0.375			
Comfortable/Uncomfortable	0.666	0.732	0.675	0.764	0.647
Interesting/Uninteresting		0.355	0.425	0.389	0.520
Expensive/Inexpensive to maintain	0.504				
Friendly/Unfriendly	0.387	0.655	0.687	0.732	0.625
Spacious/Cramped		0.429	0.420	0.437	0.343
Up-to-date/Obsolete	0.511				
Prestigious/Low status		0.346			
Useful/Useless	0.698	0.609	0.621	0.615	0.629
Beautiful/Ugly		0.584	0.537	0.504	0.504
Environmentally appropriate/Inappropriate		0.478	0.512	0.436	0.601
Easy/Difficult to clean	0.672				0.325
Exciting/Boring		0.327			

*** for this group, functionality emerged as a first dimension.

Exhibit 4.29 (continued)

Cleanliness, Lightness, and Modernness Dimension

Percent of Total Variance (rotation sums of squared loadings)	7.652	7.989	9.298	10.778	11.293
		AGE	GROUPS		
	<20 **	20-34	35-59	60-69	>70
Characterful/Characterless					
Light/Dark	0.347	0.322	0.425	0.473	0.514
Transient/Durable					
Uplifting/Depressing					0.305
Liveable/Uninhabitable					
Impressive/Unimpressive					
Comfortable/Uncomfortable			0.307		0.317
Interesting/Uninteresting					
Expensive/Inexpensive to maintain		0.513	0.537	0.448	0.596
Friendly/Unfriendly					
Spacious/Cramped	0.314			0.338	
Up-to-date/Obsolete	0.798	0.536	0.529	0.608	0.752
Prestigious/Low status	0.372			0.354	
Useful/Useless					
Beautiful/Ugly					
Environmentally appropriate/Inappropriate					
Easy/Difficult to clean		0.694	0.712	0.785	0.682
Exciting/Boring					

** Expensive/inexpensive appears as a separate fourth dimension for this group.

Exhibit 4.30: Composition of the dimensions of opinion by occupational groups aged 35-59

Socio-Aesthetic Dimension

Principal axis factoring, Varimax Rotation — Loadings less than .3 not shown: loadings >.5 underlined, >.7 italicised

	OCCUPATIONAL GROUPS			
	Service	Inter-mediate	Working	Artists
KMO sampling adequacy	0.921	0.881	0.903	0.785
Barlett's Test, Approx Chi-Square=	3,816.00	1,908.07	2,138.90	479.16
df=	105	105	105	105
sig=	0.000	0.000	0.000	0.000
Percent of Total Variance (rotation sums of squared loadings)	27.687	25.262	24.823	33.778
Characterful/Characterless	0.760	0.721	0.731	0.848
Light/Dark				
Transient/Durable		0.345		0.575
Impressive/Unimpressive	0.820	0.754	0.723	0.482
Comfortable/Uncomfortable	0.317		0.377	0.454
Interesting/Uninteresting	0.757	0.604	0.796	0.713
Expensive/Inexpensive to maintain				
Friendly/Unfriendly	0.453	0.409	0.620	0.741
Up-to-date/Obsolete	0.350	0.514		
Prestigious/Low status	0.673	0.691	0.414	
Useful/Useless				0.767
Beautiful/Ugly	0.677	0.665	0.709	0.743
Environmentally appropriate/Inappropriate		0.461	0.313	0.864
Easy/Difficult to clean				
Exciting/Boring	0.812	0.740	0.756	0.690

Serviceability Dimension

	OCCUPATIONAL GROUPS			
	Service	Inter-mediate	Working	Artists
Percent of Total Variance (rotation sums of squared loadings)	17.462	20.273	14.665	16.316
Characterful/Characterless	0.437	0.426	0.464	0.378
Light/Dark				
Transient/Durable	0.599	0.541	0.498	
Impressive/Unimpressive	0.302			0.675
Comfortable/Uncomfortable	0.566	0.870	0.467	
Interesting/Uninteresting	0.363	0.498	0.355	0.543
Expensive/Inexpensive to maintain				
Friendly/Unfriendly	0.652	0.780	0.512	
Up-to-date/Obsolete				0.490
Prestigious/Low status				0.844
Useful/Useless	0.560	0.626	0.582	
Beautiful/Ugly	0.521	0.503	0.486	0.312
Environmentally appropriate/Inappropriate	0.575		0.605	
Easy/Difficult to clean				
Exciting/Boring				0.446

Cleanliness, Lightness, and Modernness Dimension

	OCCUPATIONAL GROUPS			
	Service	Inter-mediate	Working	Artists
Percent of Total Variance (rotation sums of squared loadings)	12.22	13.831	17.56	12.181
Characterful/Characterless				
Light/Dark	0.484	0.534	0.623	0.438
Transient/Durable				0.320
Impressive/Unimpressive				
Comfortable/Uncomfortable	0.379			
Interesting/Uninteresting				
Expensive/Inexpensive to maintain	0.605	0.655	0.671	0.814
Friendly/Unfriendly				
Up-to-date/Obsolete	0.502	0.449	0.615	
Prestigious/Low status			0.615	
Useful/Useless	0.400			
Beautiful/Ugly				
Environmentally appropriate/Inappropriate				
Easy/Difficult to clean	0.738	0.722	0.830	0.761
Exciting/Boring				-0.315

Exhibit 4.31: Composition of the dimensions of opinion by 'working' groups of different ages

Socio-Aesthetic Dimension

Principal axis factoring, Varimax Rotation
Loadings less than .3 not shown: loadings >.5 underlined, >.7 bolded and italicised

	AGE GROUPS			
	20-34	35-59	60-69	>70
Percent of Total Variance	16.821	24.823	25.281	18.851
(rotation sums of squared loadings)				
KMO sampling adequacy	0.884	0.903	0.892	0.846
Barlett's Test, Approx Chi-Square=	1,063.44	2,138.90	1,067.58	803.99
df=	105	105	105	105
sig=	0.000	0.000	0.000	0.000
Characterful/Characterless	0.723	0.731	0.778	0.636
Light/Dark				
Transient/Durable	0.380			
Impressive/Unimpressive	0.592	0.723	0.742	0.674
Comfortable/Uncomfortable	0.337	0.377	0.323	0.331
Interesting/Uninteresting	0.670	0.796	0.679	0.653
Expensive/Inexpensive to maintain				
Friendly/Unfriendly	0.313	0.620	0.531	0.465
Up-to-date/Obsolete			0.420	
Prestigious/Low status	0.438	0.414	0.525	
Useful/Useless				
Beautiful/Ugly	0.316	0.709	0.733	0.715
Environmentally appropriate/Inappropriate		0.313		
Easy/Difficult to clean				
Exciting/Boring	0.644	0.756	0.718	0.629

Serviceability Dimension

	AGE GROUPS			
	20-34	35-59	60-69	>70
Percent of Total Variance	27.013	14.665	10.222	14.166
(rotation sums of squared loadings)				
Characterful/Characterless	0.499	0.464	0.338	0.313
Light/Dark				
Transient/Durable	0.684	0.498	0.690	0.626
Impressive/Unimpressive	0.414			
Comfortable/Uncomfortable	0.607	0.467	0.689	0.567
Interesting/Uninteresting	0.522	0.355	0.388	0.348
Expensive/Inexpensive to maintain				
Friendly/Unfriendly	0.748	0.512	0.597	0.534
Up-to-date/Obsolete				
Prestigious/Low status				
Useful/Useless	0.680	0.582	0.770	0.600
Beautiful/Ugly	0.823	0.486	0.392	
Environmentally appropriate/Inappropriate	0.692	0.605	0.648	0.553
Easy/Difficult to clean			0.351	0.344
Exciting/Boring	0.480			

Cleanliness, Lightness, and Modernness Dimension

	AGE GROUPS			
	20-34	35-59	60-69	>70
Percent of Total Variance	18.033	17.560	14.264	19.069
(Rotation Sums of Squared Loadings)				
Characterful/Characterless				
Light/Dark	0.396		0.499	0.530
Transient/Durable				
Impressive/Unimpressive	0.412			
Comfortable/Uncomfortable			0.300	
Interesting/Uninteresting				
Expensive/Inexpensive to maintain	0.936	0.671	0.398	0.540
Friendly/Unfriendly				
Up-to-date/Obsolete	0.644	0.615	0.668	0.640
Prestigious/Low status	0.668	0.615	0.443	
Useful/Useless				
Beautiful/Ugly				
Environmentally appropriate/Inappropriate			0.322	0.410
Easy/Difficult to clean	0.416	0.830	0.796	0.677
Exciting/Boring				0.322

Exhibit 4.32: Differences in amount of total variance accounted for by first three dimensions of opinion by age and occupational groups

Percent of Total Variance Explained by First Three Dimensions for Different Age Groups

	AGE GROUPS				
	<20	20-34	35-59	60-69	>70
Number of Evaluations	557	980	1,542	468	469
Socio-Aesthetic	19.9%	24.9%	24.2%	22.1%	19.6%
Serviceability	22.3%	21.1%	20.7%	19.9%	19.8%
Cleanliness+Lightness	7.7%	8.0%	9.3%	10.8%	11.3%
Total %	49.8%	53.9%	54.1%	52.8%	50.7%

Percent of Variance as Explained by the First Three Dimensions

	<20	20-34	35-59	60-69	>70
Socio-Aesthetic	39.9%	46.1%	44.7%	41.9%	38.6%
Serviceability	44.8%	39.0%	38.2%	37.7%	39.1%
Cleanliness+Lightness	15.4%	14.8%	17.2%	20.4%	22.3%
Total %	100.0%	100.0%	100.0%	100.0%	100.0%

Percent of Total Variance Explained by First Three Dimensions for Occupational Groupings Aged 35-59

	OCCUPATIONAL GROUPS		
	Service	Intermediate	Worker
Number of Evaluations	626	261	293
Socio-Aesthetic	27.7%	25.3%	24.8%
Serviceability	17.5%	20.3%	14.7%
Cleanliness+Lightness	12.2%	13.8%	17.6%
Total %	57.4%	59.4%	57.0%

Percent of Variance as Explained by the First Three Dimensions

	Service	Intermediate	Worker
Socio-Aesthetic	48.3%	42.6%	43.5%
Serviceability	30.4%	34.1%	25.7%
Cleanliness+Lightness	21.3%	23.3%	30.8%
Total %	100.0%	100.0%	100.0%

Percent of Total Variance Explained by First Three Dimensions for 'Working Group' By Age Group

	AGE GROUPS			
	20-34	35-59	60-69	>70
Number of Evaluations	123	293	122	149
Socio-Aesthetic	16.8%	24.8%	25.3%	18.9%
Serviceability	27.0%	14.7%	14.7%	14.2%
Cleanliness+Lightness	18.0%	17.6%	14.3%	19.1%
Total %	61.9%	57.1%	54.2%	52.1%

Percent of Variance as Explained by the First Three Dimensions

	20-34	35-59	60-69	>70
Socio-Aesthetic	27.2%	43.5%	46.6%	36.2%
Serviceability	43.7%	25.7%	27.1%	27.2%
Cleanliness+Lightness	29.1%	30.8%	26.3%	36.6%
Total %	100.0%	100.0%	100.0%	100.0%

4.4.8 Perceptual Maps

Mean factor scores were generated from the results of the factor analysis, which were then plotted to create perceptual maps. While the overall assessment gives a simple one-dimensional response, the factor scores can yield more information about the nature of consumer opinion. The factor scores for the three emergent dimensions could be plotted in three-dimensional space. However to achieve clarity on paper, they have been plotted in two dimensions, two at a time (Exhibit 4.33 and 4.34).

One of the issues discussed by Churchill (1999) involves the aggregation of respondents. Creating a map for each consumer, would be labour intensive, however, conversely, excessive aggregation can "imply a homogeneity in perceptions that probably does not exist" (Churchill, 1999, p.424). Accordingly, the respondents have been grouped according to the major age categories, however each group is still made up of a range of individuals, in particular, of different educational attainments and occupations. These maps suggest how collective waves of consumers may have assigned value to houses over the past five or six decades.

A variety of perceptual maps were generated, however Exhibits 4.33 and 4.34 show the results for the factor scores for different age groups, based on the factor analysis including all respondents aged twenty and over. As previously noted, the main consuming groups created the dimensions of opinion in approximately the same way, although the weighting they gave to each was different. This is preferred to plotting the mean factor scores based on the separate factor analyses performed on each group, as the standardised results mean that the responses for each age group have the same standard deviation, which is clearly not the case.

Attribute-based perceptual maps only relate to the adjectives tested. For example, respondents were not asked about the investment aspects of the houses, which could potentially form a separate dimension. A scale such as 'good potential for long-term appreciation' may have been found to be uncorrelated with the other dimensions, but presumably, beliefs about resale are reflected in the overall scores assigned, but not in the perceptual maps.

In this experiment, because the adjective scales used are positive/negative in nature ('useful/useless', and 'impressive/unimpressive', for example), it is possible to gain insights into the perceived desirability of the different house forms, and of individual houses. Houses toward the upper right of the graphs are perceived superior to those towards the lower left, relative to the two dimensions plotted on each. Adjectives used in other research, such as 'tight/loose' or 'delicate/rugged', are not obviously positive/negative scales, so maps including these would position a house type relative to others, but would not necessarily indicate preference.

Exhibit 4.33 plots the 'socio-aesthetic' and 'cleanliness, lightness, and modernness' mean factor scores for the four main consumer age groups for the different house types. Similarly, Exhibit 4.34 plots the 'socio-aesthetic' and 'serviceability' mean factor scores. Coloured arrows show how the esteem for the houses may have 'moved' over time, as different cohorts have come to dominate the housing market.

Differences between market groups can be noted by the movement of the mean factor scores on the perceptual maps. For example, while all groups assessed Victorian houses within the same range on the 'cleanliness and lightness' dimension, the perception of their 'socio-aesthetic' performance varies between consumer groups. This, in part, accounts for the low overall scores given to Victorian houses by the oldest age groups. It was seen in the overall scores that the oldest group tended to show limited esteem for Victorian Reproductions. Exhibit 4.33 shows that older consumers, unlike other groups, placed the Reproduction houses very close to the authentic Victorians relative to 'cleanliness and lightness', which again indicates that they may not be able to identify them to the same extent as younger consumers. Curiously, while the oldest groups did not perform well at dating the 1980-90s developer houses, they positioned them differently than other house forms, in particular those of the 1950-70s.

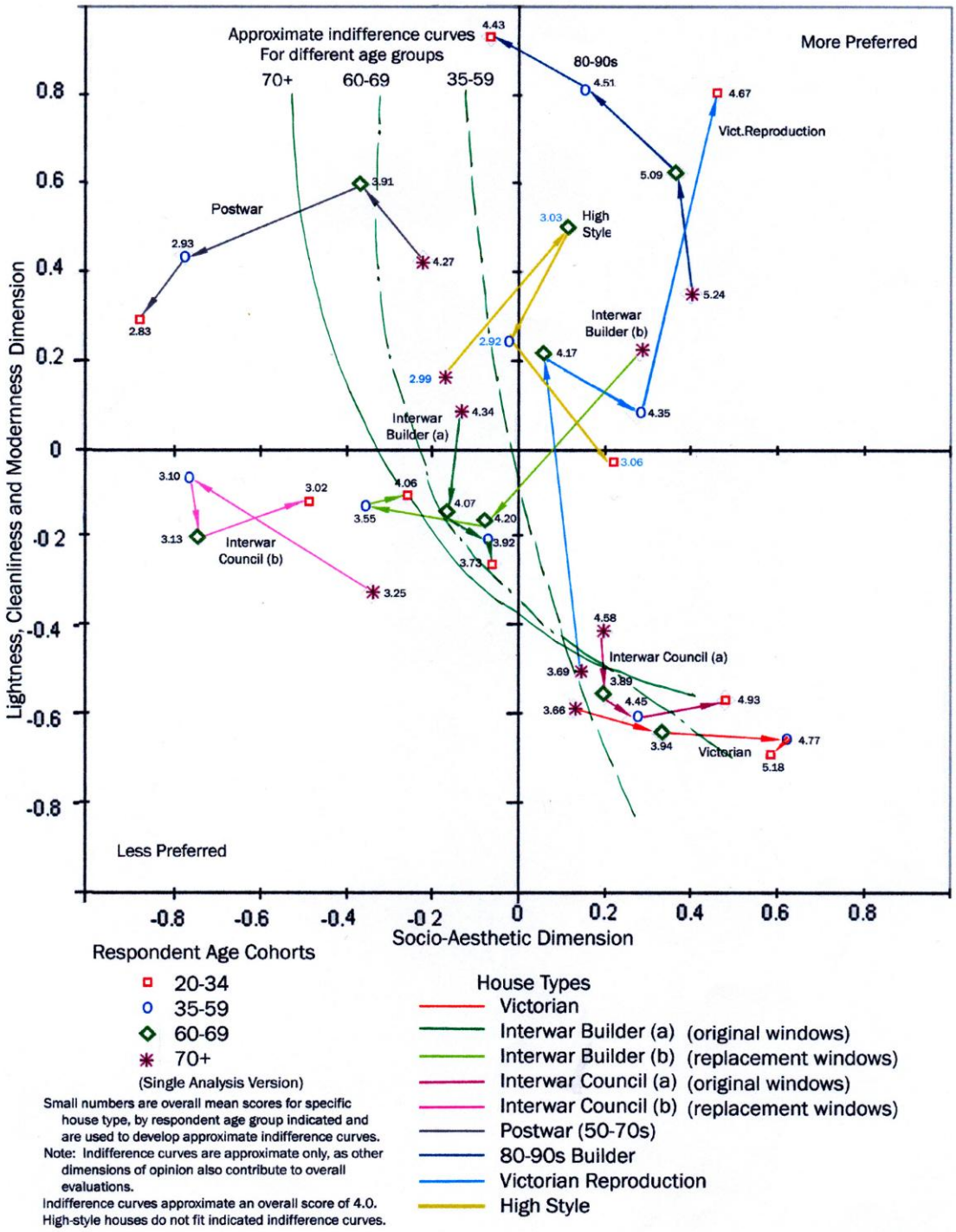
For individuals and population sub-sets, it is possible using the overall scores, to draw suggested indifference curves through the perceptual maps. Any house which placed on the same line will be assigned the same level of preference relative to the two variables plotted. This is clearest on Exhibit 4.33 which relates 'socio-aesthetic' and 'cleanliness and lightness' evaluations. Curves for the overall house evaluation of 4.0 were drawn for each age group. As was seen numerically in Exhibit 4.32, older respondents put a high emphasis on 'cleanliness and lightness'. In the perceptual map, this is manifested as an indifference curve which is less steep than that of younger consumers. This indicates that younger consumers are more willing to sacrifice 'cleanliness and lightness' to achieve 'socio-aesthetic' gains than are older groups. Convex curves emerged, which conforms to usual observations and assumptions: "...for empirical work there is little objection to the assumption that preferences are convex..." (Deaton, 1986, p.1769). The reason for this is a 'diminishing marginal rate of substitution' (Hope, 1999, p.6). If a room has a one square metre window, another square metre is a big difference, and potentially of considerable value: if a room has four square metres of windows, another square metre is not of such consequence.

The representation of the dimensions of esteem for the various house types should, using three dimensions, be plotted in three-dimensional space. Showing indifference curves relating 'socio-aesthetic' and the 'cleanliness and lightness' dimensions is possible in two dimensions, because the respondents tended to discriminate less between houses on the 'serviceability' dimension. The main exception are the High-Style houses, which are regarded as very deficient relative to 'serviceability', so a two-dimensional analysis does not align with the overall scores assigned to this

house type. A more complete representation in three dimensions would yield an 'indifference plane', and the High-Style houses would be placed more appropriately.

The curves reflect the degree of importance assigned to the dimensions. Accordingly, an individual or group assigning great importance to the 'cleanliness and light' dimension, will tend to choose an 80-90s developer house (viewed as the 'lightest and cleanest' by all groups). In contrast, Victorian houses were ranked highly from a 'socio-aesthetic' perspective. Individuals and groups who put a great weighting on 'socio-aesthetic' matters, such as younger consumers, will be attracted to Victorian houses, and presumably be willing to pay more for them.

Exhibit 4.33 Perceptual Map: Socio-aesthetic and Cleanliness, lightness, and modernness mean factor scores for different age groups



Respondent Age Cohorts

- 20-34
- 35-59
- 60-69
- 70+

(Single Analysis Version)

Small numbers are overall mean scores for specific house type, by respondent age group indicated and are used to develop approximate indifference curves.

Note: Indifference curves are approximate only, as other dimensions of opinion also contribute to overall evaluations.

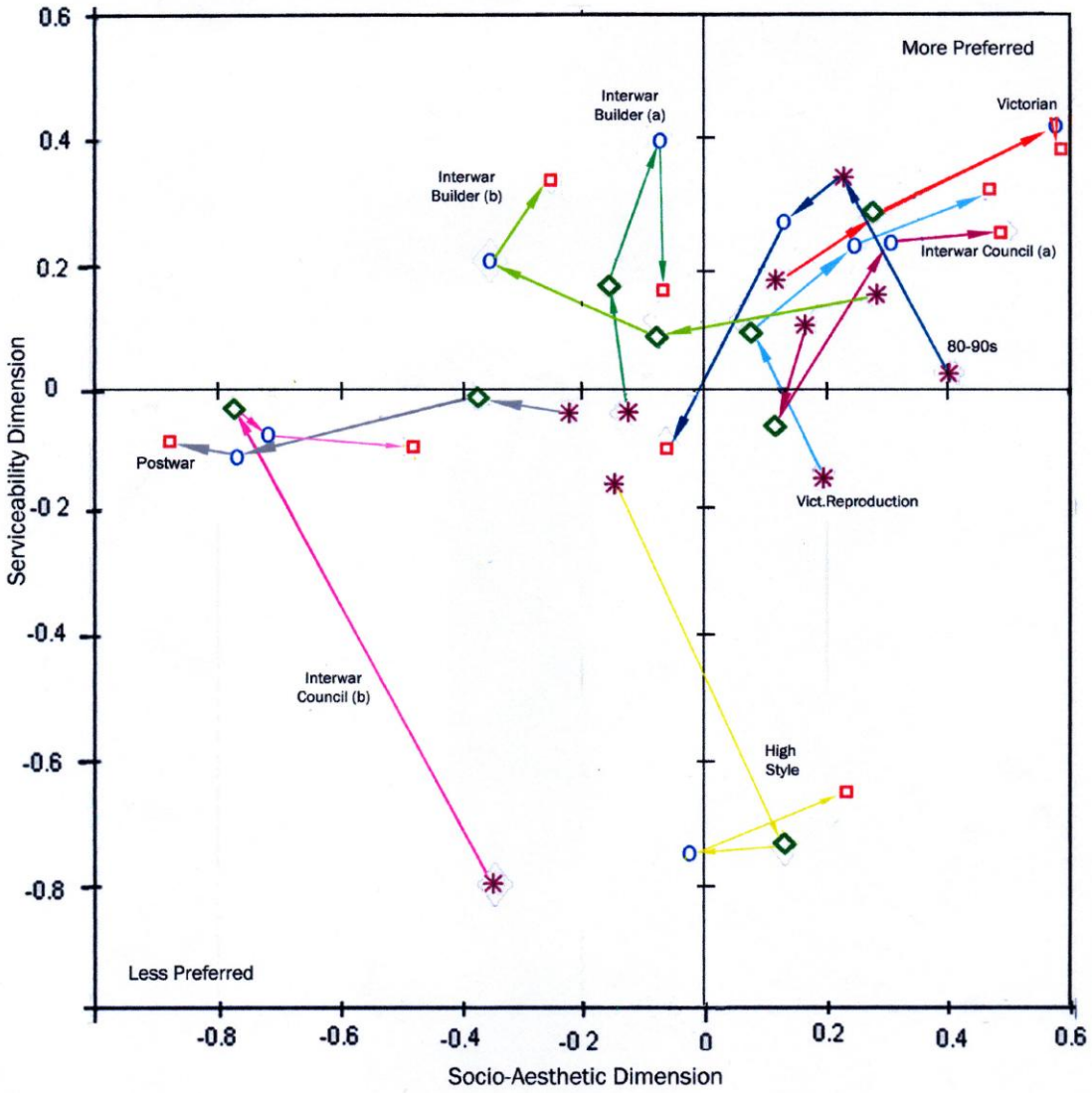
Indifference curves approximate an overall score of 4.0.

High-style houses do not fit indicated indifference curves.

House Types

- Victorian
- Interwar Builder (a) (original windows)
- Interwar Builder (b) (replacement windows)
- Interwar Council (a) (original windows)
- Interwar Council (b) (replacement windows)
- Postwar (50-70s)
- 80-90s Builder
- Victorian Reproduction
- High Style

Exhibit 4.34 Perceptual Map: Socio-aesthetic and Serviceability mean factor scores for different age groups



Respondent Age Cohorts

- 20-34
- 35-59
- 60-69
- 70+

(Single Analysis Version)

House Types

- Victorian
- Interwar Builder (a) (original windows)
- Interwar Builder (b) (replacement windows)
- Interwar Council (a) (original windows)
- Interwar Council (b) (replacement windows)
- Postwar (50-70s)
- 80-90s Builder
- Victorian Reproduction
- High Style

4.4.9. Use of Specific Adjectives

Consideration of individual adjectives, identified as important by the factor analysis, can further assist in understanding how consumers assign value to the various services offered by different house types. In particular, how different age and occupational groups applied them to different house types, was explored. One-way analysis of variance (ANOVA) was used as a tool to assist in identifying differences in responses.

(a) Evaluation of Victorian Houses

Based on a focus on house life-cycles, the responses to the Victorian houses are of most interest, as they are the oldest houses included in the experiment, as well as forming the oldest element of the stock of significant size in the study area.

Exhibits 4.35 and 4.36 show the mean responses for important adjectives, by age and main occupational groups. From these exhibits it can be noted that, relative to the 'socio-aesthetic variables, the younger consumers assigned higher levels of 'impressiveness', 'excitement', and 'prestige' to the Victorian houses, than did the 70+ groups. Among the 70+ group, the people from the 'service' occupations ranked such houses lower, relative to the three key 'socio-aesthetic' variables, than did those in 'working' occupations. Similarly, the oldest 'working' groups provided higher scores relative to the 'serviceability' variables (except 'liveable' where the low number of responses implied a non-significant difference between groups). On an overall basis, the level of 'usefulness' assigned by the younger groups was marginally lower than that assigned by the older respondents. While the level of 'comfort' assigned generally increased for the younger groups, it is possible that younger groups assume the presence of central heating, which may not be the case for the older groups. Clear patterns are not apparent for the 'clean and light' variables, although an upwards trend might be suggested.

A visual inspection of the graphs indicates that two processes may be responsible for the increased preference for Victorian houses. Generally, younger groups offered higher 'socio-aesthetic' scores than did the older respondents. In addition, relative to the 'cleanliness and lightness' adjectives, the ANOVA for 'light/dark' between consumer groups was not significant. For all the consumer groups, excepting the 'high achievers' very low mean scores were given for 'easy/difficult to clean'.

Occupational classification plays a clear role, relative to the attitudes of the oldest respondents. This suggests that when the over-70s were the dominant consumer group, Victorian houses would have been in low esteem among more affluent consumers.

Exhibit 4.35: Victorian houses: Adjective use by different respondent groups

SOCIO-AESTHETIC ADJECTIVES

IMPRESSIVE / UNIMPRESSIVE

Mean	<20	20-34	35-59	60-69	70+	
High Achievers		4.75	4.62	4.50		
Service	3.52	4.54	4.45	4.58	2.95	
Intermediate		4.38	4.76	4.25	3.64	
Worker		4.81	4.37	4.00	3.75	

Evaluations: N=	<20	20-34	35-59	60-69	70+	
High Achievers		4	13	4	0	
Service	101	72	121	19	20	
Intermediate		26	41	8	14	
Worker		21	46	20	24	
Total	101	123	221	51	58	554

One Way ANOVA: Between different consumer age/occupational groups: F= 3.37318; sig= 0

Note:
'Mean' refers to the mean score for the responses relative to specific adjective pairs. Responses were made on a seven point scale, ranging from 7 (high) to 1 (low). Hence, for impressive/unimpressive a low score indicates that the respondent group saw the house type under consideration as unimpressive. A high score means that they saw it as highly impressive.

CHARACTERFUL / UNCHARACTERFUL

Mean	<20	20-34	35-59	60-69	70+	
High Achievers		5.33	5.15	5.50		
Service	3.89	5.56	5.21	4.00	4.05	
Intermediate		5.38	5.46	2.86	4.57	
Worker		5.71	5.47	2.93	4.25	

Evaluations: N=	<20	20-34	35-59	60-69	70+	
High Achievers		3	13	4		
Service	101	72	123	19	20	
Intermediate		26	41	7	14	
Worker		21	47	14	27	
Total	101	122	224	44	61	552

ANOVA: Between different consumer groups F= 5.8987; sig= 0.0000

PRESTIGIOUS / LOW STATUS

Mean	<20	20-34	35-59	60-69	70+	
High Achievers		4.75	4.36	4.00		
Service	3.29	4.67	4.61	4.79	3.53	
Intermediate		4.09	4.68	4.50	4.33	
Worker		4.52	4.30	2.67	3.88	

Evaluations: N=	<20	20-34	35-59	60-69	70+	
High Achievers		4	11	4	0	
Service	94	60	103	19	17	
Intermediate		23	23	8	9	
Worker		21	46	15	26	
Total	94	108	183	46	52	483

ANOVA: Between different consumer groups F= 4.6120; sig= 0.0000

Exhibit 4.35 (continued)

EXCITING / BORING

Mean	<20	20-34	35-59	60-69	70+
High Achievers		4.33	4.27	4.00	
Service	3.27	4.37	4.30	4.16	2.71
Intermediate		4.17	4.68	4.50	4.44
Worker		4.81	4.09	3.47	3.17

Evaluations: N=	<20	20-34	35-59	60-69	70+	
High Achievers		3	11	4	0	
Service	96	60	104	19	17	
Intermediate		23	34	8	9	
Worker		21	47	15	24	
Total	96	107	196	46	50	495

ANOVA: Between different consumer groups F= 3.9614
sig= 0.0000

SERVICEABILITY ADJECTIVES

LIVEABLE / UNINHABITABLE

Mean	<20	20-34	35-59	60-69	70+
High Achievers		5.33	5.38		
Service	4.75	5.09	5.17	5.63	5.00
Intermediate		5.07	5.52	5.63	4.20
Worker		5.22	5.34	4.73	4.86

Evaluations: N=	<20	20-34	35-59	60-69	70+	
High Achievers		3	8			
Service	72	35	72	16	6	
Intermediate		15	31	8	5	
Worker		18	41	11	14	
Total	72	71	152	35	25	355

ANOVA: Between different consumer groups F= 1.1959
sig= 0.2447 N/S

COMFORTABLE / UNCOMFORTABLE

Mean	<20	20-34	35-59	60-69	70+
High Achievers		5.00	4.38	4.50	
Service	4.12	5.01	4.73	5.00	4.13
Intermediate		4.92	5.00	4.88	4.50
Worker		5.14	4.85	4.29	4.93

Evaluations: N=	<20	20-34	35-59	60-69	70+	
High Achievers		3	13	4		
Service	101	71	122	19	20	
Intermediate		25	41	8	14	
Worker		21	46	21	27	
Total	101	120	222	52	61	556

ANOVA: Between different consumer groups F= 2.2249
sig= 0.0009

Exhibit 4.35 (continued)

USEFUL / USELESS

Mean	<20	20-34	35-59	60-69	70+
High Achievers		4.67	4.77	4.25	
Service	4.17	4.92	4.59	4.89	4.63
Intermediate		4.46	4.88	5.13	4.93
Worker		4.85	4.60	4.62	4.78

Evaluations: N=	<20	20-34	35-59	60-69	70+	
High Achievers		3	13	4		
Service	101	71	121	19	20	
Intermediate		26	41	8	14	
Worker		20	47	21	27	
Total	101	120	222	52	61	556

ANOVA: Between different consumer groups F= 1.5885
sig= 0.0404

CLEAN, LIGHT, AND MODERN ADJECTIVES

LIGHT / DARK

Mean	<20	20-34	35-59	60-69	70+
High Achievers		4.00	3.18	4.50	
Service	3.23	4.03	3.73	4.00	3.24
Intermediate		3.74	3.50	2.86	3.22
Worker		4.05	3.45	2.93	3.79

Evaluations: N=	<20	20-34	35-59	60-69	70+	
High Achievers		3	11	4	0	
Service	96	60	106	19	17	
Intermediate		23	34	7	9	
Worker		21	47	14	24	
Total	96	107	198	44	50	495

ANOVA: Between different consumer groups F= 1.5251
sig= 0.0565 N/S

EASY / DIFFICULT TO CLEAN

Mean	<20	20-34	35-59	60-69	70+
High Achievers		4.33	3.36	3.75	
Service	4.42	3.61	3.53	3.84	3.78
Intermediate		3.74	3.79	3.75	3.67
Worker		3.86	3.55	3.13	3.38

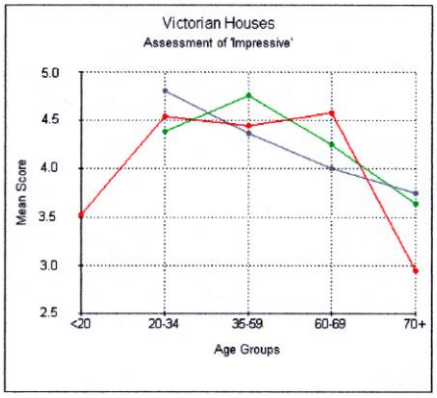
Evaluations: N=	<20	20-34	35-59	60-69	70+	
High Achievers		3	3	4		
Service	96	59	11	19	18	
Intermediate		23	105	8	9	
Worker		21	34	15	24	
Total	96	106	153	46	51	452

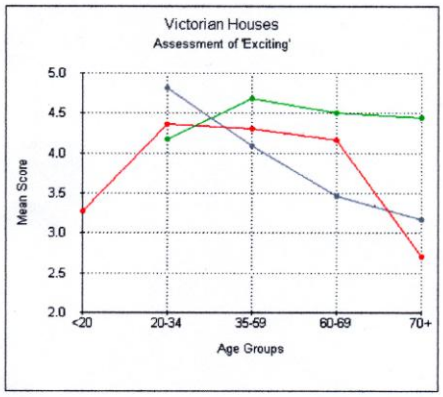
ANOVA: Between different consumer groups F= 2.1291
sig= 0.0018

Exhibit 4.36: Victorian houses: Adjective use by different groups (graphs)

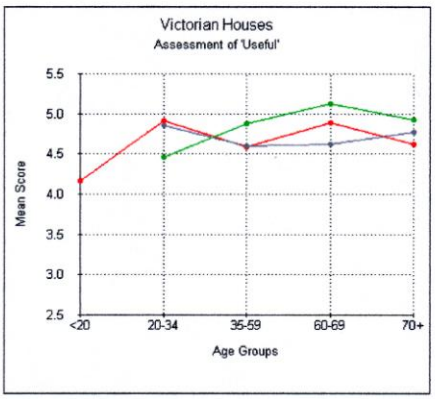
Occupational Groups: Service Intermediate Working

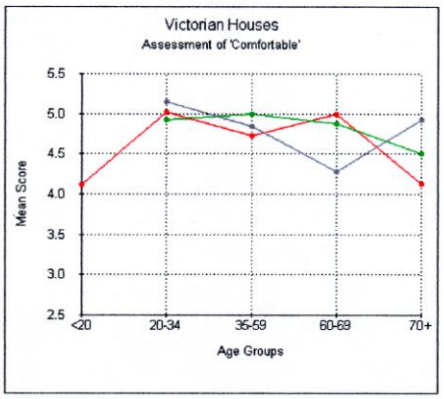
Socio-Aesthetic Variables



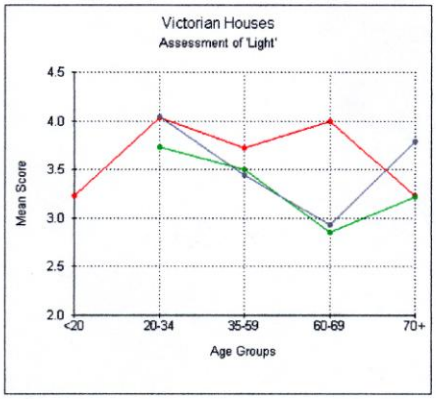


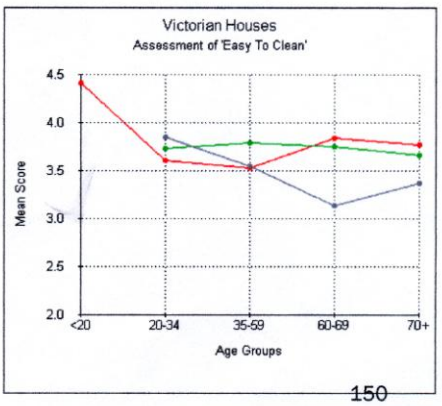
Serviceability Variables





Cleanliness, Lightness, and Modernness Variables





(b) Evaluation of Different House Types

Exhibit 4.37 shows the use of the adjectives, by age, for respondents who indicated 'service' or 'working' occupations. Exhibit 4.38 summarises the ANOVA for differences between house type with respect to each adjective pair for each age/occupational group. Some socio-aesthetic adjectives, notably 'exciting', show larger differences for the younger respondents, in particular for the 'service' occupations, than for the older groups. In contrast, for 'lightness' the groups aged 20-34 did not show a statistically significant difference between house types, suggesting that this market group do not use lightness as an important way to evaluate houses.

(i) Adjectives loading highly on the socio-aesthetic dimension

Impressive/Unimpressive:

The oldest groups assigned relatively high levels of 'impressiveness' to both types of Interwar houses. Subsequently, the Interwar Builder houses fell in esteem among the 'service' group, while they remained esteemed by 'workers'. Conversely, the Council-Built Interwar houses fell in 'impressiveness' among the 'workers', but not to the same extent among the 'service' group, although it rose again among the age 20-34 'working' group.

Neither group saw the Postwar (50-70s) houses as being particularly 'impressive', although the older 'working' groups saw them as more 'impressive' than did other respondents.

The 80-90s Builder houses were regarded as 'impressive' by 'working' groups aged 35-69, who ranked them in first place among the house types. In contrast, the 'service' groups saw them as much less 'impressive'.

The rankings of 'impressiveness' varies both by age group and by occupation. For example, the 60-69 'service' group ranked Victorian, Victorian Reproductions, High-Style, and Interwar Council-Built houses above the 80-90s builder houses while the 60-69 'workers' regarded the 80-90s Builder houses as the most 'impressive', by a significant margin.

Characterful/Uncharacterful and Exciting/Boring:

Exciting, is correlated with characterful, as major components of socio-aesthetic evaluations. For example, there was a correlation coefficient of 0.734 (Spearman's) between 'characterful' and 'exciting' for the 35-59 'service' group.

Exhibit 4.37: Use of adjectives for various house types by 'service' and 'working' respondents of different ages.

Two highest ranking house types in each age/occupational group underlined.

Two lowest ranking house types in each age/occupational group in small font.

SOCIO-ECONOMIC ADJECTIVES

Adjectives with high loadings on the socio-economic dimension.

IMPRESSIVE / UNIMPRESSIVE

	SERVICE GROUP ONLY					WORKING GROUP ONLY				
Mean Scores	20-34	35-59	60-69	70+		20-34	35-59	60-69	70+	
Victorian	4.54	4.45	4.58	2.95		4.81	4.37	4.00	3.75	
Interwar Builder (a)	3.66	3.56	3.53	4.12		3.75	4.05	4.40	4.12	
Interwar Council (a)	4.00	3.34	4.25	4.79		4.00	3.76	2.73	4.25	
50-70s Postwar	2.62	2.52	2.85	3.00		2.40	2.65	3.75	3.62	
80-90s Builder	3.84	4.02	4.22	4.00		3.80	4.41	5.00	4.45	
Victorian Reproduction	4.19	4.06	4.56	3.31		4.25	4.27	3.91	3.45	
High Style	4.15	3.58	4.53	3.82		3.74	2.98	3.21	4.39	
Mean	3.856	3.648	4.075	3.713	3.823	3.821	3.784	3.858	4.004	3.867
Range:	1.923	1.923	1.729	1.836		2.410	1.758	2.273	1.000	
Number of Observations	20-34	35-59	60-69	70+		20-34	35-59	60-69	70+	
Victorian	72	121	19	20		21	46	20	24	
Interwar Builder (a)	35	71	15	17		12	42	15	17	
Interwar Council (a)	26	41	12	14		10	25	11	8	
50-70s Postwar	76	107	20	20		20	37	24	26	
80-90s Builder	61	102	18	15		15	32	18	20	
Victorian Reproduction	73	103	9	16		16	33	23	20	
High Style	82	125	15	17		19	51	28	28	
Number of Evaluations	425	670	108	119	1322	113	266	139	143	661

CHARACTERFUL / UNCHARACTERFUL

	SERVICE GROUP ONLY					WORKING GROUP ONLY				
Mean Scores	20-34	35-59	60-69	70+		20-34	35-59	60-69	70+	
Victorian	5.56	5.21	5.32	4.05		5.71	5.47	4.75	4.26	
Interwar Builder (a)	4.31	3.80	3.50	4.24		4.75	4.45	4.40	4.24	
Interwar Council (a)	4.50	3.69	4.30	4.90		5.11	4.10	3.10	4.43	
50-70s Postwar	2.71	2.37	2.62	3.03		2.14	2.38	3.54	3.74	
80-90s Builder	3.28	3.67	4.24	3.85		3.40	4.29	5.05	4.95	
Victorian Reproduction	4.67	4.47	4.78	4.21		4.23	4.47	4.57	4.15	
High Style	4.29	3.83	4.73	3.71		4.15	2.82	2.93	4.40	
Mean	4.189	3.863	4.212	3.997	4.065	4.214	3.996	4.048	4.309	4.142
Range:	2.844	2.841	2.697	1.875		3.571	3.090	2.121	1.212	
Number of Observations	20-34	35-59	60-69	70+		20-34	35-59	60-69	70+	
Victorian	72	123	19	20		21	47	20	27	
Interwar Builder (a)	35	71	16	17		12	42	15	17	
Interwar Council (a)	22	32	10	10		9	20	10	7	
50-70s Postwar	76	108	21	20		21	37	24	27	
80-90s Builder	61	84	17	13		15	28	19	21	
Victorian Reproduction	67	92	9	14		13	30	23	20	
High Style	82	126	16	17		20	51	28	30	
Number of Evaluations	415	636	106	111	1268	111	255	138	149	653

EXCITING / BORING

	SERVICE GROUP ONLY					WORKING GROUP ONLY				
Mean Scores	20-34	35-59	60-69	70+		20-34	35-59	60-69	70+	
Victorian	4.39	4.30	4.16	2.71		4.81	4.09	3.47	3.17	
Interwar Builder (a)	3.54	3.09	3.53	3.71		3.00	3.54	3.69	3.71	
Interwar Council (a)	4.00	3.39	3.73	4.38		3.40	3.60	3.56	3.63	
50-70s Postwar	2.12	2.14	2.70	2.89		2.30	2.51	4.00	3.33	
80-90s Builder	3.09	3.54	3.28	3.36		3.20	3.94	4.65	4.15	
Victorian Reproduction	4.12	4.11	4.44	3.08		4.13	4.30	2.82	3.55	
High Style	4.07	3.49	3.87	3.31		3.95	3.08	2.82	4.20	
Mean	3.618	3.436	3.672	3.350	3.519	3.540	3.579	3.571	3.677	3.592
Range:	2.264	2.159	1.744	1.679		2.510	1.790	1.829	1.033	
Number of Observations	20-34	35-59	60-69	70+		20-34	35-59	60-69	70+	
Victorian	60	104	19	17		21	47	15	24	
Interwar Builder (a)	35	69	15	14		12	41	13	14	
Interwar Council (a)	19	33	11	13		10	25	9	8	
50-70s Postwar	58	86	20	19		20	37	20	21	
80-90s Builder	55	93	18	14		15	32	17	20	
Victorian Reproduction	51	76	9	12		16	33	15	20	
High Style	72	112	15	16		19	50	22	25	
Number of Evaluations	350	573	107	105	1135	113	265	111	132	621

INTERESTING / UNINTERESTING

	SERVICE GROUP ONLY					WORKING GROUP ONLY				
Mean Scores	20-34	35-59	60-69	70+		20-34	35-59	60-69	70+	
Victorian	4.88	4.85	4.79	3.80		5.19	4.70	4.33	4.43	
Interwar Builder (a)	3.66	3.36	4.13	4.06		4.33	3.93	4.20	4.06	
Interwar Council (a)	4.42	3.83	4.00	4.21		4.80	4.28	2.55	3.50	
50-70s Postwar	2.62	2.45	2.55	2.95		2.15	2.46	3.92	3.67	
80-90s Builder	3.26	3.70	4.11	4.00		3.13	4.00	5.47	5.09	
Victorian Reproduction	4.50	4.68	4.44	3.69		4.25	4.33	4.17	3.59	
High Style	4.56	4.12	5.33	4.00		4.26	3.12	3.46	4.50	
Mean	3.985	3.854	4.193	3.816	3.962	4.017	3.832	4.015	4.119	3.996
Range:	2.257	2.392	2.783	1.264		3.040	2.243	2.928	1.587	
Number of Observations	20-34	35-59	60-69	70+		20-34	35-59	60-69	70+	
Victorian	72	123	19	20		21	47	21	28	
Interwar Builder (a)	35	70	16	17		12	42	15	17	
Interwar Council (a)	26	40	12	14		10	25	11	8	
50-70s Postwar	76	108	20	20		20	37	24	27	
80-90s Builder	61	102	18	15		15	32	19	23	
Victorian Reproduction	72	103	9	16		16	33	23	22	
High Style	82	125	15	17		19	51	28	30	
Number of Evaluations	424	671	109	119	1323	113	267	141	155	676

PRESTIGIOUS / LOW STATUS

	SERVICE GROUP ONLY					WORKING GROUP ONLY				
Mean Scores	20-34	35-59	60-69	70+		20-34	35-59	60-69	70+	
Victorian	4.47	4.61	4.79	3.53		4.52	4.30	2.67	3.88	
Interwar Builder (a)	3.83	3.77	4.07	3.93		3.55	4.12	4.00	3.93	
Interwar Council (a)	4.05	3.85	4.27	4.15		3.88	4.04	2.67	3.39	
50-70s Postwar	2.91	3.01	3.35	3.58		2.95	3.19	4.11	4.11	
80-90s Builder	4.33	4.65	4.50	4.14		4.87	4.84	5.41	3.95	
Victorian Reproduction	4.47	4.14	4.89	3.92		4.73	4.42	3.47	3.76	
High Style	4.35	4.31	5.47	4.69		4.44	4.06	4.05	4.73	
Mean	4.058	4.050	4.476	3.992	4.144	4.134	4.140	3.766	3.965	4.001
Range:	1.557	1.641	2.117	1.158		1.917	1.655	2.745	1.342	

Number of Observations	20-34	35-59	60-69	70+		20-34	35-59	60-69	70+	
Victorian	60	103	19	17		21	46	15	26	
Interwar Builder (a)	35	70	15	15		11	42	13	15	
Interwar Council (a)	20	33	11	13		8	25	9	9	
50-70s Postwar	58	85	20	19		20	37	19	23	
80-90s Builder	55	95	18	14		15	32	17	19	
Victorian Reproduction	51	76	9	12		15	33	15	21	
High Style	72	112	15	16		19	50	22	26	
Number of Evaluations	351	574	107	106	1138	109	265	110	139	623

SERVICEABILITY ADJECTIVES

Adjectives with high loadings on the functionality dimension.

USEFUL / USELESS

	SERVICE GROUP ONLY					WORKING GROUP ONLY				
Mean Scores	20-34	35-59	60-69	70+		20-34	35-59	60-69	70+	
Victorian	4.92	4.59	4.80	4.63		4.85	4.60	4.62	4.78	
Interwar Builder (a)	4.38	4.59	4.73	4.74		4.50	4.79	5.07	4.82	
Interwar Council (a)	4.27	4.25	4.73	4.82		5.00	4.68	3.45	4.75	
50-70s Postwar	4.37	4.68	4.71	5.13		3.95	4.59	5.00	4.96	
80-90s Builder	4.54	4.72	4.72	5.20		4.36	4.88	4.72	5.09	
Victorian Reproduction	4.65	4.67	4.63	4.62		4.67	4.67	4.61	4.89	
High Style	4.17	4.00	4.80	4.91		3.53	3.98	3.79	4.55	
Mean	4.471	4.499	4.732	4.863	4.641	4.407	4.597	4.465	4.835	4.576
Range:	0.745	0.723	0.175	0.582		1.474	0.895	1.612	0.539	

Number of Observations	20-34	35-59	60-69	70+		20-34	35-59	60-69	70+	
Victorian	71	121	19	20		20	47	21	27	
Interwar Builder (a)	34	70	15	19		10	42	15	17	
Interwar Council (a)	26	40	11	14		8	25	11	8	
50-70s Postwar	76	107	21	20		20	37	24	23	
80-90s Builder	61	101	18	15		14	32	18	22	
Victorian Reproduction	71	102	8	17		15	33	23	14	
High Style	82	124	15	17		19	50	28	29	
Number of Evaluations	421	665	107	122	1315	106	266	140	140	652

COMFORTABLE / UNCOMFORTABLE

	SERVICE GROUP ONLY					WORKING GROUP ONLY				
Mean Scores	20-34	35-59	60-69	70+		20-34	35-59	60-69	70+	
Victorian	5.01	4.73	5.00	4.13		5.14	4.85	4.29	4.93	
Interwar Builder (a)	4.66	4.61	4.75	5.35		4.92	5.33	4.79	5.35	
Interwar Council (a)	4.46	4.15	4.55	5.10		5.00	4.52	3.55	4.78	
50-70s Postwar	4.18	4.06	4.62	5.20		4.15	4.68	5.04	5.15	
80-90s Builder	4.92	4.94	4.94	5.53		4.53	5.41	5.75	5.61	
Victorian Reproduction	4.89	4.65	4.78	4.86		4.88	4.91	4.65	4.60	
High Style	4.05	3.93	4.33	4.76		4.16	4.26	3.29	4.93	
Mean	4.596	4.438	4.710	4.990	4.684	4.682	4.850	4.478	5.049	4.765
Range:	0.965	1.014	0.667	1.408		0.993	1.146	2.464	1.009	
Number of Observations	20-34	35-59	60-69	70+		20-34	35-59	60-69	70+	
Victorian	71	122	19	20		21	46	21	27	
Interwar Builder (a)	35	71	16	17		12	42	14	17	
Interwar Council (a)	26	40	11	14		10	25	11	9	
50-70s Postwar	76	108	21	20		20	37	24	27	
80-90s Builder	61	102	18	15		15	32	20	23	
Victorian Reproduction	73	102	9	16		16	33	23	60	
High Style	82	124	15	17		19	50	28	29	
Number of Evaluations	424	669	109	119	1321	113	265	141	192	711

CLEANLINESS AND LIGHTNESS ADJECTIVES

Adjectives with high loadings on the Cleanliness and Lightness dimension.

LIGHT / DARK

	SERVICE GROUP ONLY					WORKING GROUP ONLY				
Mean Scores	20-34	35-59	60-69	70+		20-34	35-59	60-69	70+	
Victorian	4.03	3.73	4.00	3.24		4.05	3.45	2.93	3.79	
Interwar Builder (a)	4.29	4.11	4.19	4.57		4.00	4.48	4.62	4.57	
Interwar Council (a)	3.70	3.42	4.25	3.85		3.80	3.16	3.56	3.38	
50-70s Postwar	4.24	4.29	5.10	4.84		4.40	4.43	4.75	4.70	
80-90s Builder	4.56	4.53	4.56	4.64		4.73	4.30	5.47	5.29	
Victorian Reproduction	4.51	4.30	4.33	4.08		4.53	4.57	3.93	4.38	
High Style	3.86	4.12	4.53	4.19		5.05	3.96	4.52	4.81	
Mean	4.171	4.074	4.422	4.201	4.217	4.367	4.049	4.253	4.415	4.271
Range:	0.864	1.109	1.095	1.607		1.253	1.407	2.542	1.911	
Number of Observations	20-34	35-59	60-69	70+		20-34	35-59	60-69	70+	
Victorian	60	106	19	17		21	47	14	24	
Interwar Builder (a)	35	70	16	14		12	42	13	14	
Interwar Council (a)	20	33	12	13		10	25	9	8	
50-70s Postwar	58	85	21	19		20	37	20	23	
80-90s Builder	55	95	18	21		15	32	17	21	
Victorian Reproduction	51	17	9	12		15	77	14	21	
High Style	72	113	15	16		19	51	21	26	
Number of Evaluations	351	519	110	112	1092	112	311	108	137	668

EASY / DIFFICULT TO CLEAN

	SERVICE GROUP ONLY					WORKING GROUP ONLY				
Mean Scores	20-34	35-59	60-69	70+		20-34	35-59	60-69	70+	
Victorian	3.61	3.52	3.84	3.78		3.86	3.55	3.13	3.38	
Interwar Builder (a)	4.06	4.07	4.25	4.86		4.50	4.07	4.23	4.86	
Interwar Council (a)	4.11	3.70	3.67	4.31		4.00	3.44	3.22	3.50	
50-70s Postwar	4.67	4.71	5.00	5.37		4.68	4.84	5.45	4.67	
80-90s Builder	5.20	4.73	5.00	5.64		5.20	5.38	5.50	5.38	
Victorian Reproduction	4.76	4.49	4.67	4.08		4.38	4.76	4.00	4.24	
High Style	4.43	4.33	4.67	5.31		3.84	4.34	4.32	5.15	
Mean	4.406	4.220	4.442	4.763	4.458	4.353	4.340	4.265	4.452	4.352
Range:	1.590	1.203	1.333	1.865		1.358	1.935	2.367	2.006	

Number of Observations	20-34	35-59	60-69	70+		20-34	35-59	60-69	70+	
Victorian	59	105	19	18		21	47	15	24	
Interwar Builder (a)	35	70	16	14		12	41	13	14	
Interwar Council (a)	19	33	12	13		9	25	9	8	
50-70s Postwar	58	85	21	19		19	37	20	24	
80-90s Builder	55	95	18	14		15	32	18	21	
Victorian Reproduction	51	76	9	13		16	33	15	21	
High Style	72	112	15	16		19	50	22	27	
Number of Evaluations	349	576	110	107	1142	111	265	112	139	627

SUMMARY OF ANALYSIS OF VARIANCE TABLES

Significance of differences between respondent groups for various adjectives applied to different house forms.

Significances at the .05 per cent level are underlined

Respondent group		Impressive		Characterful		Exciting		Interesting		Prestigious		Useful		Comfortable		Light/Dark		Easy to Clean	
		F	sig.	F	sig.	F	sig.	F	sig.	F	sig.	F	sig.	F	sig.	F	sig.	F	sig.
Aged <20		9.83	0.00	9.96	0.00	8.99	0.00	12.25	0.00	10.05	0.00	8.01	0.00	10.78	0.00	10.22	0.00	3.10	0.00
Aged 20-34	Service	11.82	0.00	21.18	0.00	15.35	0.00	17.60	0.00	9.04	0.00	3.20	0.00	6.64	0.00	1.92	0.05	9.69	0.00
	Worker	2.54	0.01	5.82	0.00	3.08	0.00	4.19	0.00	4.11	0.00	2.00	0.05	1.47	0.17	0.81	0.61	2.68	0.01
Aged 35-59	Service	16.40	0.00	29.24	0.00	15.87	0.00	25.71	0.00	15.46	0.00	4.83	0.00	8.10	0.00	5.43	0.00	11.67	0.00
	Worker	8.56	0.00	15.48	0.00	4.72	0.00	8.23	0.00	4.87	0.00	2.73	0.00	5.74	0.00	4.00	0.00	7.65	0.00
Aged 60-69	Service	2.67	0.01	5.21	0.00	1.65	0.11	5.17	0.00	3.37	0.00	0.26	0.98	1.26	0.27	1.70	0.10	2.82	0.01
	Worker	2.91	0.00	5.14	0.00	1.88	0.06	4.73	0.00	6.14	0.00	5.20	0.00	8.87	0.00	5.30	0.00	8.43	0.00
Aged 70+	Service	2.32	0.02	1.98	0.05	1.85	0.07	1.72	0.09	1.52	0.15	0.88	0.54	3.24	0.00	2.59	0.01	5.14	0.00
	Worker	1.64	0.11	1.39	0.20	1.96	0.05	2.69	0.01	1.78	0.08	2.46	0.01	2.38	0.01	2.84	0.00	6.66	0.00

Exhibit 4.38: Analysis of variance for important adjectives by 'service' and 'working' respondents of different ages.

'Characterfulness' had a high loading on the socio-aesthetic dimension for every group. While it was highly associated with the overall scores, a number of differences between the groups are important. Firstly, the small range of opinion between the various house types among older consumers, compared with the younger groups, can be noted. In particular, the 70+ 'workers' only weakly differentiated between the house types on the basis of character: the major feature of this group was that they felt that the Postwar (50-70s) houses lack character, but that the 80-90s Builder houses had it. The limited range of opinion is typical among older respondents relative to variables which load heavily on the socio-aesthetic dimension.

The 50-70s houses were seen as least characterful by all age groups, except the 60-69 'working' group, some of whom had bought them new, although they still scored them below the average. This suggests that while the older groups may regard them as offering good basic shelter, they still see them as 'boring' and 'characterless'.

There is some suggestion that the Interwar houses may be becoming more esteemed among the 20-34 'service' group. For example, relative to 'exciting', the mean score from the 'service' group, rose from 3.09 for the 35-59 group, to 3.54 for the 20-34 group, although it fell from 3.54 to 3.00 for their 'working' counterparts.

The Victorian Reproductions can be compared with the 80-90s Builder houses, as these two types are the main supply of new houses in the area, although there are now some Interwar Reproductions evident. For consumers under 60, both 'service' and 'working', the Reproduction houses scored higher. Among the 60-69 groups, the 'service' respondents gave higher scores to the Reproductions, while the 'workers' scored the 80-90 Builders higher. To both 70+ groups, the 80-90 Builders were preferred.

Relative to 'exciting' the difference between the 'service' and 'worker' groups aged 60-69 was interesting. While the 'service' respondents believed that the Victorians and Victorian Reproductions were most 'exciting', the 'working' group put the Postwar (50-70s) and 80-90s Builder houses in these positions. This suggests that for older 'workers', excitement may be associated with newness, unlike the more affluent groups, which associate it with historical attributes. Only the 70+ 'workers' ascribed much 'excitement' to the High-Style houses.

Interesting/Uninteresting:

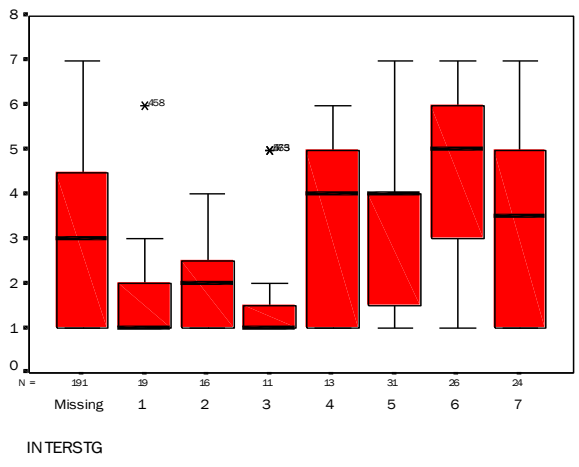
Porteous (1977, p.229) noted that many findings demonstrate that preferences are "generally related to intermediate amounts of stimulus complexity." Kaplan & Kaplan (1989) discussed structures which dealt with interestingness, and how it might predict preferences. Although their models invoked other variables, they suggested that preference has an inverted 'U' shaped relationship with interest. Hence, as a building becomes more complex it becomes more interesting, and more preferred, however at high levels of complexity and expressed 'interestingness', the

building tends to be seen as less coherent, hence less preferred, as order and comprehension disappear. Although this experiment was not designed to test this relationship, it can be noted that at very high levels of interest, when all houses were considered, this relationship did not emerge, however, if only the houses not associated with a recognisable style (the High-Styles and the Miscellaneous) are considered, the 'inverted U' relationship is quite clear. Respondents who evaluated a house at the top of the 'interestingness' scale, tended to offer lower overall scores than did those who saw them as somewhat less interesting.

Exhibit 4.39: Relationship between overall scores and interestingness for High-style and Miscellaneous houses

	Overall Scores		
Interesting	Mean	N	Std. Deviation
1 (Low)	1.74	19	1.28
2	1.94	16	.93
3	1.82	11	1.60
4	3.46	13	1.98
5	3.23	31	1.82
6	4.42	26	1.81
7 (High)	3.42	24	2.08
Total	3.04	140	1.94

Exhibit 4.40: Boxplot showing overall scores and interestingness: High-style and miscellaneous houses



Prestigious/Low Status:

While 'impressiveness' would appear to relate to one's own sense of what is appealing, an evaluation of 'prestigiousness' would seem to be based on how one expects such a house to be assessed by others in determining the social status of the occupant. Prestige, as related to building materials, was explored by Sadalla and Sheets (1993). The differences in how the 'working' group and the 'service' group perceived 'prestigiousness' were quite clear. Among the 'service' respondents aged under 60, Victorian and Victorian Reproduction houses were regarded as highly prestigious, while 'workers' focussed on the 89-90s houses and the Reproductions. Among the 70+ group (both 'service' and 'workers'), High-Style houses were seen as most 'prestigious' but Victorian houses were ranked last. The 'working' groups all ranked the 80-90s Builder houses as most 'prestigious', except the 70+ respondents who placed the High-Style houses first, and the 50-70

Postwar houses second. The 'workers' aged under 60 placed the Victorian Reproductions in second place.

(ii) Adjectives Loading highly on the serviceability dimension

Useful/Useless:

Relative to usefulness, the means expressed for the 'service' groups had a considerably smaller range than for the 'working' groups, except for respondents aged 70+. In a housing market dominated by people in 'service' occupations, there would be little differentiation between most of the house types, relative to what type was 'useful'. The 'workers' aged 60-69 and 20-34 both showed more discrimination relative to these adjectives: presumably the 60-69 group, who became housing consumers in the Postwar period were very concerned about the functional quality of a deteriorating housing stock, and the youngest 'working' consumers are most conscious about obtaining an adequate house within limited budgets. The tendency of all of the groups except the 'service' respondents aged over 60, is to give low scores to the High-Style houses, usually placing them last.

Comfortable/Uncomfortable:

All of the 'service' and 'worker' groups, except the 'workers' aged under 35, evaluated the 80-90s Builder houses first or second in comfort. The 'service' groups ranked the Victorian houses first or second, except the 70+ group, which placed them in last position, which is what this group did with Victorian houses relative to 'impressive'. Again the 'High-Style' houses were given low scores by all of the groups aged under 60.

(iii) Adjectives Loading highly on the 'Cleanliness, Lightness, and Modernness' dimension

Light/Dark

Light/Dark is one of the more interesting adjective pairs. In contrast to the 'socio-aesthetic' variables, the range of the means for the various house type evaluations was generally greater for the older respondents than the youngest, suggesting a greater degree of market opinion. It can be seen that the Victorian houses were perceived to be low in 'lightness' by all groups. Again, this attribute seems less consequential in the evaluation of houses by younger groups. The uniformly high 'lightness' scores of the 80-90s houses, in contrast, appears to be important to older cohorts, who collectively ranked such houses in first place.

Easy/Difficult-to-Clean

The assessments of 'easy-to-clean' were not markedly different through the age groups, with the newest houses scoring highest on this variable, and the Victorians receiving low scores.

4.4.10 Window Replacements in Interwar Houses

Houses can undergo modification to reflect changing consumer expectations. It was noted that many of the Interwar houses, both those built for owner-occupancy and those council-built, have had windows replaced, effectively creating two visual forms. Accordingly, the two forms of each house type were included in the survey: those with original windows, and those with replacement windows which lack the original mullions and glazing bars. Exhibit 4.9 shows some of the photographs which were used to explore these forms.

This adds a further level of complexity to the housing life-cycle, again not well explored: that is that the house can be modified over time, as an adaptation to new sets of values. How different groups might regard the 'improvements' may give further insight into the formation and operation of value relative to houses.

(a) Overall Scores

The window change clearly affected the overall scores assigned by the different age groupings (Exhibit 4.41). For the Interwar Builder houses, the younger age groups gave higher overall scores to the houses with the original windows, while respondents over 60 scored the houses with replaced windows higher. A somewhat similar pattern exists for the Interwar Council houses, except for the respondents aged 70-79 who assigned considerably lower scores to the houses with replaced windows. The lines for Council-built houses do not cross, presumably because of the much greater impact on appearance of the window replacements. When the glazing bars are removed, the Council-built houses may be regarded as somewhat featureless rendered boxes, while the Interwar Builder houses still retain some form due to their bays, and brickwork. The lack of difference in opinion among the under 20 group, with respect to the Interwar Council-built houses, suggests this is an acquired response.

Exhibit 4.41 Overall scores for interwar houses with and without replaced windows

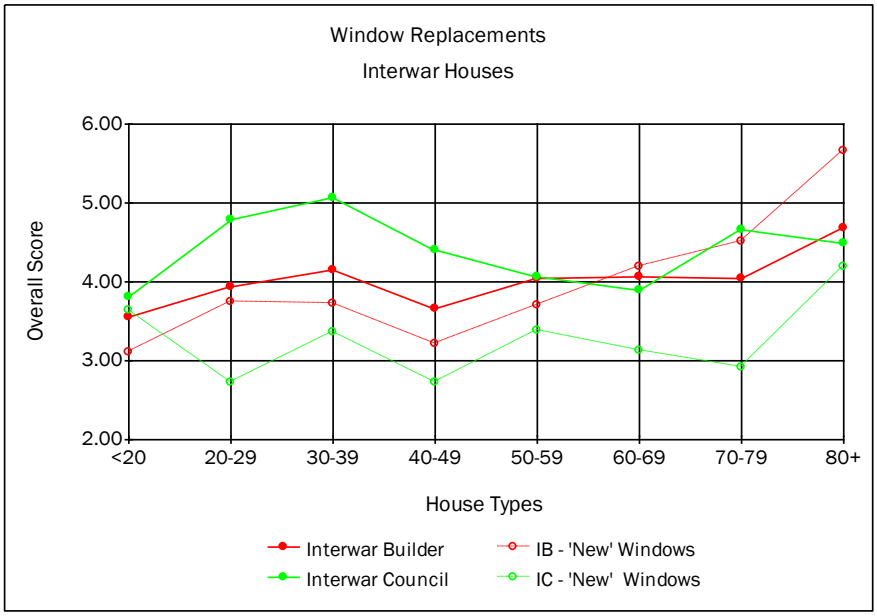
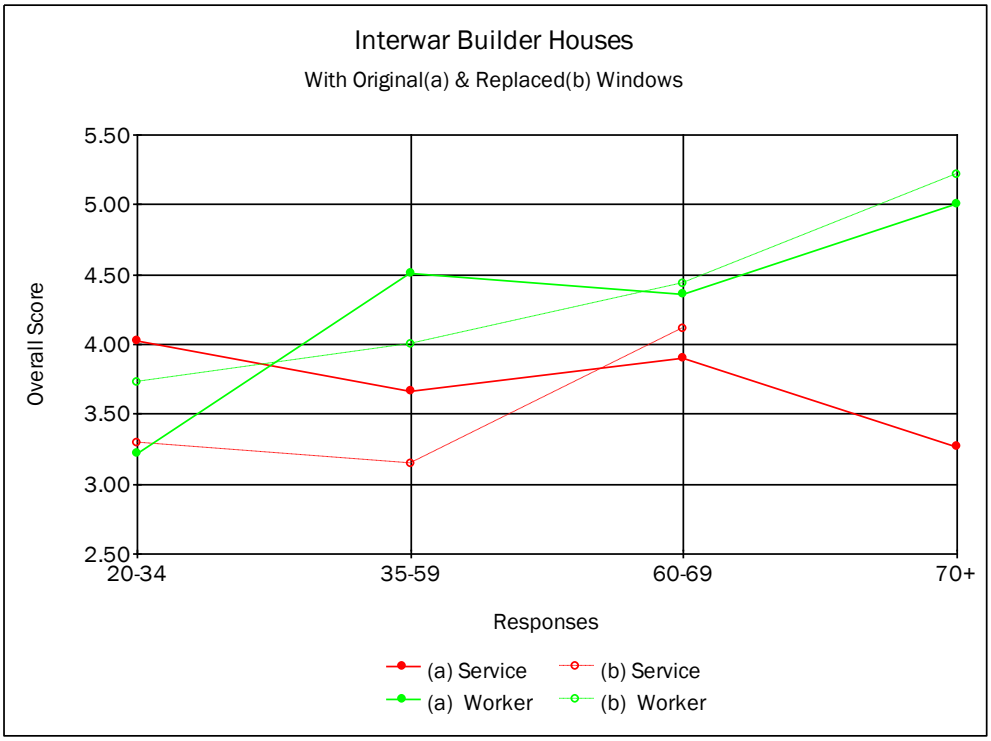


Exhibit 4.42, which divides the respondents into 'service' and 'working' groups by age, offers further insights. For both, those aged 60 and over scored the Interwar Builder houses with the replaced windows higher. In contrast, both groups aged 35-59 preferred the houses with the original windows. Among those aged 20-34 the 'workers' again preferred the houses with replaced windows, while the difference between the two types apparently increased for the 'service' respondents. This may be due to the importance of 'inexpensive to maintain' for the youngest group of 'workers'. Presumably they expect, and value, low heating costs and lower maintenance costs offered by new windows. This shows that, for the 20-34 age group, the overall market preference for original windows in these houses is driven by the preponderance of people in 'service' occupations - both for the respondents and in the overall population.

Exhibit 4.42: Overall scores: service and worker groups for interwar builder houses. (graph and table)



INTERWAR BUILDER HOUSES - Mean Scores

		20-34	35-59	60-69	70+
Service Groups	(a) Original Windows	4.02	3.67	3.90	3.27
	N=	46	89	21	11
	(b) Replaced Windows	3.29	3.15	4.11	
	N=	17	39	9	1
Working Groups	(a) Original Windows	3.22	4.51	4.36	5.00
	N=	18	49	14	23
	(b) Replaced Windows	3.73	4.00	4.44	5.22
	N=	11	20	9	9

(b) Use of Specific Important Adjectives for the Interwar Builder Houses

Exhibit 4.43 shows how some of the main groups used specific adjectives relative to the two forms of the Interwar Builder houses.

All groups aged over 20, thought that the houses with the original windows were more impressive. Interestingly, the 'service' respondents aged 60-69 found the houses with the replaced windows more 'characterful', 'exciting', 'interesting', and 'prestigious', which was different than the 'working' group which, for the socio-aesthetic variables, only scored the houses with replaced windows higher relative to 'exciting'. The 70+ 'working' group found the houses with replaced windows more 'exciting', 'interesting', and 'prestigious'.

For the variables 'useful/useless' and 'comfortable/uncomfortable', which loaded highly on the 'serviceability' dimension, all 70+ groups assigned higher ratings to the houses with the replaced windows. The 'working' groups aged under 60 saw the houses with the replaced windows as more 'comfortable', a sentiment not shared by the 60-69 group.

In that window replacements should obviously influence the perceived 'lightness' of a house, it demands consideration. For the 'service' groups, the respondents over 60 thought that the house with the replacement windows was lighter, while the reverse was the case for the younger groups. Among the 'working' groups, all but the 60-69 group felt that the house with the replacement windows would be lighter. In contrast, all groups deemed the Interwar Council considerably lighter with the replacement windows. As noted earlier, the 'cleanliness, lightness, and modernness' dimension accounted for higher amounts of overall variance among the older respondents. The visual change in the builder house is less obvious than for the council-built houses, and for the younger groups, who may be less concerned with lightness, the factor may be overwhelmed by the haloing effect of their overall assessment of Interwar houses.

(c) Window Replacement Discussion

As was previously noted, the refurbishment of houses is one expression of consumer choice. The individual homeowner has a range of possible actions relative to window replacement, and many elected to replace deteriorating windows in the interwar stock with aluminium-framed 'picture' windows. As well as improving thermal comfort, these windows also had an impact on the appearance of the houses. The responses (Exhibit 4.41) suggests that the current dominant body of 'service' consumers are more likely to buy replacement windows with some degree of resemblance to the originals, which accords with more recent refurbishments, where historical authenticity in refurbishment appears to be of importance, even outside of the city conservation area.

What appears to be occurring, is that within the attitude structure of a typical individual over 60, the

net value of an Interwar Builder house is increased when the windows are replaced, because 'functionality' is enhanced. The fact that the house may have diminished 'socio-aesthetic' value is of relatively less importance than for younger people (except the 20-34 'workers'). The younger 'service' groups do not believe that the non-authentic replacement windows increase 'usefulness', 'comfortableness', or 'lightness'.

While younger groups were quite clear that they believe aluminium 'picture' windows have a marked negative impact on the 'prestigiousness' of a house, this was not shared by older consumers. One might hypothesise that some groups believe that having 'new' aluminium windows enhances prestige, perhaps as a display of wealth, or of being 'clean', 'light', and 'up-to-date', even while they personally believe them to make the house less 'impressive'' or 'exciting'. To the younger 'service' person, 'prestigiousness' derives from some other factor, perhaps historical authenticity, which is diminished by the window replacements.

Exhibit 4.43: Interwar Builder houses with different windows: Mean scores assigned for important adjectives

IMPRESSIVE / UNIMPRESSIVE

		20-34	35-59	60-69	70+
Service Groups	(a) Original Windows	3.66	3.56	3.53	3.33
	N=	35	71	15	18
	(b) Replaced Windows	3.05	2.94	3.43	3.29
	N=	20	35	7	7
Working Groups	(a) Original Windows	3.75	4.05	4.40	4.12
	N=	12	42	15	17
	(b) Replaced Windows	3.20	3.27	3.22	4.00
	N=	10	15	9	9

CHARACTERFUL / UNCHARACTERFUL

		20-34	35-59	60-69	70+
Service Groups	(a) Original Windows	4.31	3.80	3.50	3.84
	N=	35	71	16	19
	(b) Replaced Windows	3.40	2.94	5.14	3.86
	N=	20	35	7	7
Working Groups	(a) Original Windows	4.75	4.45	4.40	4.24
	N=	12	42	15	17
	(b) Replaced Windows	4.82	3.80	3.88	3.90
	N=	11	15	8	10

EXCITING / BORING

		20-34	35-59	60-69	70+
Service Groups	(a) Original Windows	3.54	3.09	3.53	3.39
	N=	35	69	15	18
	(b) Replaced Windows	2.53	2.66	4.14	3.00
	N=	15	29	7	7
Working Groups	(a) Original Windows	3.00	3.54	3.69	3.71
	N=	12	41	13	14
	(b) Replaced Windows	3.00	3.13	4.00	4.38
	N=	10	15	7	8

INTERESTING / UNINTERESTING

		20-34	35-59	60-69	70+
Service Groups	(a) Original Windows	3.66	3.36	3.27	3.16
	N=	35	70	15	19
	(b) Replaced Windows	3.05	2.80	3.57	3.29
	N=	20	35	7	7
Working Groups	(a) Original Windows	4.33	3.93	4.20	4.06
	N=	12	42	15	17
	(b) Replaced Windows	3.30	3.13	3.78	4.18
	N=	10	15	9	11

PRESTIGIOUS / LOW STATUS

			20-34	35-59	60-69	70+
Service Groups	(a) Original Windows		3.83	3.77	4.07	3.44
		N=	35	70	15	18
	(b) Replaced Windows		2.87	3.31	4.29	4.14
		N=	15	29	7	7
Working Groups	(a) Original Windows		3.55	4.12	4.00	3.93
		N=	11	42	13	15
	(b) Replaced Windows		3.60	3.80	3.43	4.14
		N=	10	15	7	7

USEFUL / USELESS

			20-34	35-59	60-69	70+
Service Groups	(a) Original Windows		4.38	4.59	4.73	4.74
		N=	34	70	15	19
	(b) Replaced Windows		4.21	4.03	4.43	5.29
		N=	19	35	7	7
Working Groups	(a) Original Windows		4.50	4.79	5.07	4.82
		N=	10	42	15	17
	(b) Replaced Windows		4.80	4.87	4.33	5.67
		N=	10	15	9	9

COMFORTABLE / UNCOMFORTABLE

			20-34	35-59	60-69	70+
Service Groups	(a) Original Windows		4.66	4.61	4.75	4.61
		N=	35	71	16	18
	(b) Replaced Windows		4.20	4.17	5.57	5.14
		N=	20	35	7	7
Working Groups	(a) Original Windows		4.92	5.33	4.79	5.35
		N=	12	42	14	17
	(b) Replaced Windows		5.30	4.80	4.44	5.45
		N=	10	15	9	11

LIGHT / DARK

			20-34	35-59	60-69	70+
Service Groups	(a) Original Windows		4.29	4.11	4.19	4.72
		N=	35	70	16	18
	(b) Replaced Windows		3.80	4.03	4.29	5.00
		N=	15	29	7	7
Working Groups	(a) Original Windows		4.00	4.48	4.62	4.57
		N=	12	42	13	14
	(b) Replaced Windows		4.30	4.53	4.14	4.89
		N=	10	15	7	9

EASY / DIFFICULT TO CLEAN

			20-34	35-59	60-69	70+
Service Groups	(a) Original Windows		4.06	4.07	4.25	4.33
		N=	35	70	16	18
	(b) Replaced Windows		4.50	3.83	4.57	5.14
		N=	14	29	7	7
Working Groups	(a) Original Windows		4.50	4.07	4.23	4.86
		N=	12	41	13	14
	(b) Replaced Windows		4.11	4.00	4.43	5.00
		N=	9	15	7	9

4.5 DISCUSSION

The results of this experiment will be considered in conjunction with the results of subsequent experiments, in Chapter 8. However, a few observations are worthy of specific comment.

Within the constraints of a research effort to understand consumer behaviour, it is difficult to undertake controlled or longitudinal experiments lasting decades. Furthermore, social and economic change which occurs over such long periods can compromise such efforts: Salway (1986, p.14) found that the impact of market cycles made longitudinal investigation of depreciation issues in commercial buildings impractical. A review of similar cross-sectional experiments by Stamps (1999), suggested that most, or all, experiments are deficient in one or more aspects of procedure or analysis. It is necessary to seek for some robustness - that the findings are valid regardless of minor methodological issues. In the case of this experiment, older respondents were used to gain insights into past attitudes about houses. There was nothing to suggest that, in the case of these respondents, the housing attitudes and preferences they now hold are dramatically different than those they held when they were younger. However, subsequent investigations were conducted to verify that the responses are consistent between the experiments, and that market behaviour over time aligns with that suggested by these results.

4.5.1. Changing Preferences

The overall scores verified that various age cohorts within the population prefer different house types. In particular, those under age 60, indicated a marked preference for Victorian houses. This aligns with what can be observed in the markets and in the literature: that Victorian houses and their neighbourhoods, were held in low regard for much of the twentieth century, but over the past thirty years have experienced an increase in popularity. That an ageing consumer product can undergo such a dramatic increase in esteem is not part of most marketing theory. Consumers are expected to prefer new products, which offer better performance and promise enhanced social status.

Changes over time in the attitudes, preferences, and purchase behaviour of the consuming population may have different underlying causes. The reasons for these changes might be:

(i) Human Life-cycle: The life-cycle may be considered as the sequence of events from birth to death (Cairns et al, 1996, p.43). The extent to which attitudes, preferences, and behaviour may change as people age is important with regard to how they perceive and consume (Assael, 1998, p.570-571). Material suggesting a stability in this respect, is presented in Chapter 8.

(ii) Cohort effect: Successive generations may have different attitudes and preferences, based on life experiences shared by the members of each specific generation, but not by other generations.

(iii) Changes in underlying demographic characteristics: Underlying any current study of consumers over time, in the western world, are changes in population composition, which may influence attitudes and perceptions, independent of cohort effect. Rising educational attainments may have an apparent effect on how the built environment is perceived in different eras.

If some degree of stability of preference through the human life cycle is assumed, the experiment demonstrates that both cohort effect and a changing structure of the population, apparently explain how the assignment of value to houses has changed over time.

The impact of societal structure upon consumer behaviour has often been explored. Garner and Kelly (1998, p.229-237) discussed how social changes have influenced U.K. voting patterns. Light and Prentice (1994) explored the interest in sites of historical interest based on socio-demographic characteristics of visitors. While they considered European heritage sites as a whole, their own studies in Wales underlined their fundamental premise: they found that over half of visitors to castles, ecclesiastical sites, and industrial sites were from professional/managerial groups although such groups represent only 16 per cent of the U.K. population. This vast difference in attendance remained even for urban sites with low or no admission fees, which would have been expected to attract less affluent households. As professional and managerial groups rise as a proportion of the population, interest in such sites should increase, even if specific group characteristics remain unchanged. Steinberg (1996) proposed a relationship with the level of development, whereby, during industrialisation, a premium was put on newness at the expense of heritage values, but that with increasing prosperity people started to consider their heritage. He pointed to Singapore as an example of a maturing economy which had only recently started to protect rapidly disappearing historical neighbourhoods. Steinberg found little popular interest in heritage protection in societies in the earlier stages of development, but noted the interest in preserving specific historical sites and contexts only appearing later in the development sequence. 'That was Beijing' (The Economist, 2000) discussed the motivations for the destruction of the historical districts of that city.

Relative to housing, the overall scores assigned to the Victorian houses also suggested that 'service' groups play a leadership role in establishing preferences. Their esteem for the Victorian houses, was ultimately followed by the 'worker' groups (Exhibits 4.26 and 4.27).

4.5.2. Construction of Evaluations

Considering how the different groups construct their evaluations, it is evident that groups' perceptions of attributes of different houses, and how important they regard such attributes, are both of consequence. In the past, a market consisting of people born before the Second World War, predominantly of 'working' occupations, would have focussed on the 'functional' attributes of houses, particularly matters of cleanliness and lightness. Such a focus, would have lead to the noted preference for newer houses. This is summarised on the perceptual map relating the 'socio-aesthetic' and 'cleanliness, lightness, and modernness' dimensions. While all groups placed Victorian houses low on the 'clean and light' dimension, it was important only to some.

The importance of 'cleanliness and lightness' may reflect Victorian attitudes about dark and dirty industrial revolution cities. After one interview session held at a Cambridge nursing home, a lively discussion developed among a group of elderly women, regarding how their mothers had spent so much time scrubbing front door-steps, something which their own generation had rejected, and which would now be a curiosity (one independent over-90, who declined to complete a survey, obviously still frequently scrubbed, not only her front door step, but the entire perimeter wall of her front garden). The nursing-home discussion saw the scrubbing activity as a way of representing the prudence of the family, particularly the house-wife, to the community.

This interest in 'cleanliness and light' among the older consumers might be explained as follows:

(a) Emergence of electric light. The most obvious reason for the change in importance is that the oldest cohorts were brought up in a time when lighting was not as effective or as widespread as it is now. In particular, two older male respondents, who had worked in the building industry discussed the historic lack of services in Cambridge houses. One, an electrician, indicated that through the 1950s one of his main sources of work was installing electrical services into houses which had lacked it.

(b) Reaction against Victorian fashion: This response may be also a manifestation of the generation brought up just after the First War reacting against previous housing fashion. Through the Victorian era: "...colour schemes became darker and light was obscured by curtains stressing the sanctuary - like nature of the home" (Williams, 1987, p.193).

(c) Cleaner environment: The disappearance of a coal-fired economy was accompanied by cleaner air, hence cleaner and brighter cities.

One of the clearest differences by occupational class was found relative to the new suburban houses. The 'working' groups aged over 60 assigned them very high scores relative to the main

adjectives (Exhibit 4.37). However this was not shared by the younger 'service' groups, especially with regard to the 'socio-aesthetic' variables. Older 'service' respondents typically assigning such 80-90s houses a mid-range mean score.

It was observed that younger respondents saw 50-70s Postwar houses as relatively lower in 'lightness' than older respondents (Exhibit 4.37). Hawkes et al (1987, p.128), for energy analyses, evaluated the percentage of glazed exterior envelope for various standard types of Cambridge houses. They found large Victorians to have a glazed area of 15.5% of total exterior wall area, privately-built interwar houses as 19.9%, and 1980's detached at 13.7%. Apparently, entrepreneurial builders responded to the way their markets evaluated houses: Interwar houses had large glazed areas as a response to prevailing demand: subsequently the priority given to 'lightness' decreased, and now builders respond with less glazing.

Again it is clear that the meanings of various designs, are not constant between either age or occupational groups. While the older working groups saw the 80-90s Builder houses as extremely 'characterful' and 'impressive', this was not shared by either the 'service' groups or the younger 'workers'. This clearly indicates that it is likely to be difficult to create buildings which are universally esteemed, and that to achieve success in any particular market niche, there must be some understanding of the recipient. This does suggest an answer to the question proposed by Christopher Wren in the Introduction: the esteem of architecture is certainly not based entirely on absolute and permanent sets of values, so it must be largely a result of "the laws of society and man" (Soo, 1998, p.127).

4.5.3 Responses to High-Style Houses

While not a major part of the available house stock, the responses to the High-Style houses may allow some insights into the ways consumers analyse houses.

Exhibit 4.44 shows the ranking of High-Style houses for important adjectives, relative to the various houses tested for 'service' and 'working' respondents aged 35-59. Apparently, 'service' consumers see High-Style houses as quite acceptable from the 'socio-aesthetic' and 'clean and light' perspectives. However this does not give rise to an overall esteem for the houses, as indicated by the overall score (Exhibit 4.23), and the responses to 'beautiful'. While they may be reasonably 'impressive', 'interesting', and 'exciting', they are not generally desirable. On the perceptual maps, while the high-style houses were rated at or above average with regard to 'socio-aesthetics' and 'cleanliness and lightness' they were assessed by all but the over 70s as very low relative to 'serviceability' - and the 70+ group collectively ranked them last in their overall scoring. It is possible that the respondents feel that such a house form would not fit their life-styles, so be 'uncomfortable' in the wider sense, regardless of whether or not the house is appreciated in the abstract. The

possible ‘socio-aesthetic’ and ‘cleanliness and lightness’ benefits do not outweigh the perceived risk that such a house might be ‘useless’ or ‘uncomfortable’.

Relative to the choice formula, it may be possible either that some important adjective was not included in the survey, or that consumers process information differently for unfamiliar house forms. Certainly, every group noted High-Style houses as the least familiar.

Mills (1998, p.178-179), in looking at ‘value drivers’ saw three categories, return, growth, and risk. The test adjectives focussed on return, as benefits to be derived from occupancy. No ‘growth’ adjectives were included. Such things as expected capital growth might be worth exploration. Consumers may perceive more financial risk relative to the appreciation or ease of resale of an unusual house.

One possibility is that consumers evaluate familiar house styles holistically (unless provoked to provide it in a disaggregated form, as in a survey), but attempt disaggregated processing for unfamiliar houses. The familiarity of the standard house types means that the respondents need not give a stimulus photograph detailed consideration, but can merely classify it as an example of a known genre. While logically, this should not be possible with the High-Style houses, each of which is unique, there is a further enigma in the data. No significant differences appeared between the various individual High-Style houses when evaluated on the main socio-aesthetic adjectives (Exhibit 4.45). This suggests that consumers, as a whole, did not discriminate between different High-Style houses, even though they varied considerably in appearance. Fully understanding a High-Style house, its risks and benefits, may demand a level of effort not given in the survey process. Presumably in a real purchase environment more effort would be given in understanding the houses, although it may still be simply rejected. That buildings of recognisable ‘styles’ should be treated differently than unfamiliar types has been widely discussed. Nasar (1994), for example, proposed that perceived complexity may influence responses: “An observer might judge the complexity in a recognizable style as lower than a similar level of complexity in an unrecognizable style” (p.384).

Unfamiliarity may also give rise to ‘ambiguity aversion’, discussed in Section 3.1, “…that people prefer to take risks on the basis of known rather than unknown probabilities” (Bernstein, 1996, p.280). Any house purchase is risky, however it is likely that people feel they know the risks associated with common forms of houses but not with those associated with the unfamiliar.

Exhibit 4.44 Ranking of High-Style houses relative to important adjectives, Respondents aged 35-59

1= Highest ranked, 7 = Lowest ranked		
	Service	Worker
Socio-Aesthetic Variables		
Impressive	4	6
Characterful	3	6
Interesting	3	6
Exciting	4	6
Prestigious	3	5
Beautiful	6	7
Serviceability Variables		
Liveable	7	7
Comfortable	7	7
Useful	7	7
Lightness and Cleanliness Variables		
Easy-To-Clean	4	4
Inexpensive	5	4
Light	4	5

4.45 Analysis of variance between the ten different High-Style houses for all respondents aged 35-59.

Analysis of Variance between different High-Style houses for all respondents aged 35-59.			
	N=	ANOVA** F	Sig.
Overall Score	362	2.317	0.015
Socio-Aesthetic Variables			
Impressive	248	1.204	0.294
Interesting	248	1.182	0.308
Exciting	223	0.668	0.737
Prestigious	223	1.236	0.342
Beautiful	247	1.193	0.301
Serviceability Variables			
Liveable	152	1.310	0.238
Comfortable	246	2.151	0.027
Useful	246	0.719	0.691
Lightness and Cleanliness Variables			
Up-to-Date	216	3.065	0.002
Easy-To-Clean	223	1.681	0.096
Inexpensive	238	2.385	0.014
Light	227	2.776	0.004
**ANOVA explores variances between different High-Style houses. Differences betwen various houses signficant at the 0.05 level underlined			

5.0 Experiment 2: Consumer Attitudes within a Residential Conservation Area

5.1 BACKGROUND AND OBJECTIVES

As a complement to the Attitudes and Preferences survey (Chapter 4), and to support the results thereof, a further survey was undertaken within a late-Victorian neighbourhood now designated as a Conservation Area. While the Attitudes and Preferences survey explored various house types as evaluated by housing consumers, this separate initiative was undertaken to understand how one type of housing might be evaluated by different resident groups. In this sense, the respondents will all be familiar with the urban form to which they are responding.

This survey approach has a number of advantages:

(i) The respondents can be expected to have a good knowledge of the area, so the survey responses should correlate highly with actual attitudes, perhaps better than elicited from photographs, even of well-known house types.

(ii) Many respondents will have participated in a decision to purchase or rent in the area, presumably having gathered information, and compared it with other housing possibilities in the Cambridge-centred area.

(iii) Conservation area policy is an attractive focus, in that it has been recently routinely applied to relatively ordinary residential neighbourhoods, often as a result of community pressure. That some of these areas were once designated for slum clearance, and are now seen as desirable, provides a stimulus for exploration.

In particular, the following experimental objectives were explored:

- Can evidence be found which relates a shift in overall esteem for the neighbourhood to different attitudes and preferences held by elements of the population which have emerged as important house consumers?
- Do different groups in the population assign different levels of importance to different building elements?
- Are such differences manifested in beliefs about how the planning system should deal with the neighbourhood?

In particular, this was seen as an opportunity to link attitudinal measures, with the evolution in an 'old but ordinary' residential neighbourhood, and suggest how such changes in attitudes might be reflected in planning policy.

5.2 THE STIMULUS: THE NORTH ST.MATTHEW'S AREA

5.2.1. Reasons to Study North St.Matthew's

The North St.Matthews area of Petersfield Ward in central Cambridge was selected for a number of reasons.

(i) It is physically homogeneous. Most streets consist of two-bedroom terraces fronting directly onto the pavements. Interspersed are some limited areas of slightly larger, but still relatively modest, bay-fronted houses with small front gardens.

(ii) It is located in Cambridge's central city Conservation Area, which means that detailed planning reports are available, and the attention of the residents stimulated, suggesting a good response rate. Members of the City planning staff were interested in the survey process and the results.

(iii) Literature on the area, notably Jebb (1906), Keynes (1947), and Payne (1994), together with planning material from the City of Cambridge, clearly portray the history of the area.

(iv) The neighbourhood is one in which a transition has occurred. Although some areas were slum cleared, the balance has apparently become esteemed, based on comments from City planning staff and local house prices. This suggested the presence of a range of residents, who may hold different opinions about the area.

The survey area is outlined on the map (Exhibit 5.1) and photographs of typical streetscapes are shown as Exhibit 5.2.

5.2.2. Background and Description of North St.Matthew's

The 'Mill Road & St.Matthews Area Conservation Area Appraisal', (Cambridge City Council, 1999), describes the area. The earliest surviving buildings in the St.Matthews area date from in the 1830s, however it was not until the 1870s that widespread development occurred. It "comprises narrow streets, tightly enclosed by 2 storey buildings" (Cambridge City Council, 1999, p.7). Most of the original occupants were in manual occupations, notably railway workers. The 1906 rent map of Cambridge (Jebb, 1906, inside back cover) shows that most houses in the surviving streets commanded £8 to £15 per year, not the lowest in the city, but decidedly modest. Local historian, Sarah Payne (1984, vol. 2, p.94), referring to one of the longer, and now more prestigious, streets of the area, simply stated "It was a street of poor families." In the early 1960s some of the northerly parts of St.Matthews, corresponding to the areas with 1906 rents of under £8 per year, were slum cleared and redeveloped. On some streets, one side was slum cleared, while the other is now within the conservation area.

Exhibit 5.1: Map of survey area

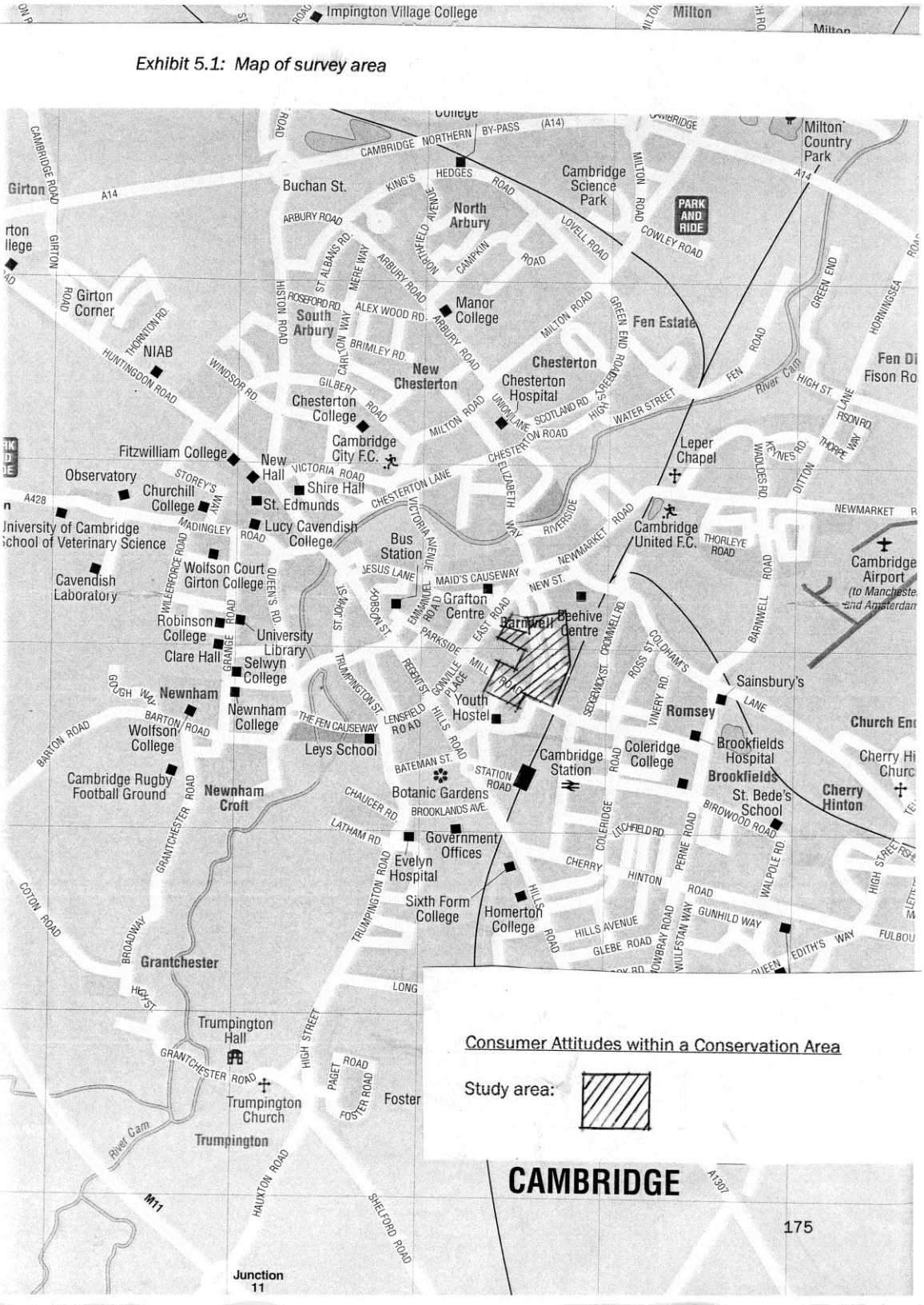


Exhibit 5.2: Photographs of the area in which the survey was conducted

Exhibit 5.4: Advertisements for typical North St.Matthew's houses

Sturton Street £169,000

Victorian end of terrace property benefits gas fired central heating, strip flooring, 120ft rear garden, lounge/diner, kitchen, study, bathroom and 2 bedrooms. Viewing recommended.

Kingston Street **£170,000**

A pretty, stylishly renovated, and well presented Victorian cottage in highly popular location just off Mill Road, with sitting room with open fire, dining room, well fitted kitchen, two bedrooms with sanded and sealed flooring, super bathroom, landscaped garden - MUST BE SEEN!

Sturton Street **£149,500**

A much improved 2 bedroom house in a popular part of the city. Recently modernised to a high standard including re-fitting of the kitchen and bathroom, redecoration and re-carpeting.

There is a ground floor bathroom, kitchenm/breakfast room and 2 first floor bedrooms. The property enjoys a fully enclosed 100ft garden. Call now to book your viewing.

adhoc, July 06, 2001

Kingston Street **£167,500**

Extended Victorian terrace house offering hall, sitting room, dining room, kitchen, 2 double bedrooms, bathroom, loft room. Many original features including cast iron fireplaces, stripped pine doors, gas heating, enclosed rear garden.

Gwydir Street **£165,000**

An opportunity to acquire a 3 bedroom terraced home in highly regarded city location.

Accommodation comprising: through lounge/diner 23'6, galley style kitchen, ground floor bathroom, 2 1st floor bedrooms (1 with small terrace 11'0 x 7'10), further attic room/bedroom 3, rear garden backing onto cemetery, gas central heating.

Although non-residential uses are concentrated along the adjacent railway line, many streets still contain some. These include builders' yards, automobile repair facilities and some light manufacturing, some of which is associated with the academic community such as musical instrument manufacture, as well as the expected pubs and small shops.

The St.Matthews District Plan of 1977 considered the issues then facing the area, and deplored existing conditions. Exhibit 5.3 shows some of the results of the 1971 *English House Condition Survey*, conducted after the clearance of the worst areas of St.Matthews. It is clear that as recently as thirty years ago, the area still remained unimproved relative to the rest of Cambridge.

Exhibit 5.3: House condition indicators: St.Matthews area, 1971

House Conditions, 1971, St.Matthews Area

	St Matthews (Area 1)	Cambridge City
No Fixed Bath	40%	9%
No Internal W.C.	36%	10%
Unfit	31%	5%

Since 1971, there has been a decrease in occupants in manual occupations; today employment is focussed on the universities and the accompanying 'high tech' industries. As a result, the area now contains a widely varied population, including not only the residuals of the old working class inhabitants, and younger middle-income groups, but individuals who rank at the highest of academic and professional levels. The statistics document the gradual disappearance of the original working class inhabitants; the 1991 census showed that 45.7 per cent of the adult male population, and 40.5 per cent of the adult females possessed a degree or diploma, up from 31.4 per cent and 22.6 per cent, respectively, a decade earlier. In 1991, 45.1 per cent of household heads had professional, managerial or technical occupations, compared with 26.3 per cent in 1981. Although the average age of the population in the area has fallen, numbers of 'old' residents remain. The mix of ages, occupations, and educational attainments, in a single neighbourhood, allows a comparison between different groups and their attitudes.

A substantial number of houses on the surveyed streets have had historically inappropriate modifications, including external rendering or painting, application of pseudo-stone, new metal window frames, metal or glass front doors and most dramatically, a few exhibit enlarged openings for 'picture windows'. There is some new infill development, however the fundamental streetscape remains intact, so in spite of the changes, the streets retain much of their Victorian character. With a reduction in the number of parked cars, and the discrete placement of a few ragged children, many views would resemble photographs of streets condemned to clearance in the mid-twentieth century. In 1993, the area was designated as a conservation area by the City of Cambridge.

In mid 2001, a typical two-bedroom terrace, in average condition, commanded £160,000 to £170,000. Exhibit 5.4 shows advertisements for typical houses. Some dwellings have been subject to substantial internal renovation, and are offered at even higher prices, although the small land areas preclude substantial increases in house size.

5.3 SURVEY DESIGN

5.3.1. Background to Conservation Areas.

Consideration of an 'old but ordinary' conservation area, such as North St.Matthews is of interest, because conservation area policy itself would appear to be a reflection of changed attitudes towards the housing stock. The general acceptance of conservation and of conservation areas as an integral part of the planning regulatory framework, has been demonstrated by widespread utilisation, as discussed in Mynors (1999), Hall (1996), Plan Local/Chesterton (1992) and Tarn (1985). However, they have also criticised that (i) legislation and policies are framed in terms of non-specific language, and (ii) that excessive discretion is given to individual planning authorities, many of which lack considered policy (Plan Local/Chesterton, 1999). This gives substantial latitude for debate around appropriate policies to follow in conservation areas. To date, little research has been undertaken to relate policy to the values, perceptions and expectations of the residents of conservation areas.

The political process has apparently responded to popular demand to create conservation areas, which is in contrast to policies of forty years ago which caused the demolition of part of the St.Matthew's area, as well as neighbourhoods of more historical interest (McClarence, 1998). The Plan Local/Chesterton study (1992, p.12) pointed to "...'snob zoning' to prevent change and development, political motivation, and designation to enhance development control powers..." as motives for creating conservation areas. Beasley (1994, p.28), in considering the appearance of design review committees in historical areas of the United States, found such committees had become popular "...not because people were so enamoured with historic districts but rather, because they saw the accompanying design review as a means of having some control over change and development, and the quality of change and development, in their neighborhood or community." Accordingly, one might suggest that it is an attitude shift among the residents of the St.Matthew's area which led it to being designated, not the intrinsic physical characteristics of the buildings. It is important to recognise the essential difference between conservation areas and historical buildings listing. Urban conservation areas can cover substantial areas, so can contain buildings which are individually of limited or perhaps no special interest. This means that the terms of reference for establishment can be highly variable, although the area is presumably of "special architectural or historic interest" (Planning (Listed Buildings and Conservation Areas) Act, 1990 s.69(a)). The North St.Matthew's area is arguably not of *special* architectural or historical interest: it is similar to vast areas of late Victorian workers' terraces and not especially associated with significant events or persons.

5.3.2. Development of Questionnaire

A four-part questionnaire was developed (Exhibit 5.5), which used conservation area issues as an incentive to respond, but was directed towards eliciting responses about people's attitudes towards the area.

First Section

The first part contained ten Likert scale questions regarding attitudes toward matters of planning policy. The first two asked for a response to the questions 'I feel that this area is of special architectural interest' and 'I feel that this area is of special historical interest': which served to express the degree to which the respondent believes that the neighbourhood warrants its designation as a conservation area, according to the legislative framework.

Second Section

The second part asked the respondents to choose from a set of fifty-four adjectives those which they felt applied to their street. There was no limit on the number of adjectives they could choose. Baker (1991, p.153) saw this method as a derivative of the semantic differential scale structure, offering both advantages and disadvantages. While it is simple, understandable and direct, requires less consideration on the part of the respondent, and allows the inclusion of many more adjectives, Baker pointed out that it gives no measure of distance between the adjectives. This means that if a respondent selects the adjective 'dirty', one does not know whether it means 'a bit dirty' or 'very dirty'.

The adjectives employed were initially based on a set previously used in a building use survey by Cambridge Architectural Research Limited. These were modified by including adjectives which were included in the Attitudes and Preferences survey (Chapter 4), as well as others which appear in City of Cambridge documents as descriptive of Victorian neighbourhoods. While more words could have been employed, it was felt that a larger set would (i) reduce the response rate, and (ii) would not yield a corresponding benefit in the response. The adjectives focussed on the subjective attitudes held towards the neighbourhood: this structure orients respondents in that direction - asking whether the neighbourhood is 'crowded' is different than attempting to objectively relate the area of a dwelling or neighbourhood to the number and functional needs of its occupants.

Third Section

The third section asked which of eighteen building elements the respondent thought the city should, or should not, control. Conservation area guidance brochures from fifty-five planning authorities across the country were reviewed, and the building elements chosen for the survey were those which were frequently mentioned and which could relate to the North St.Matthew's

area. Utility boxes were also included; City of Cambridge planners thought the response might be of interest, although utility boxes are not controllable by local planning authorities. The respondents were asked to indicate their choice of the four most important and four least important elements to be controlled. This restrained the 'strict preservationist' respondents who otherwise would likely have indicated that they felt that everything was important. This also ensured that all of the surveys carried the same weight in the analysis. Libertarians, however, were allowed the response 'I do not believe the planning system should control any of these things.'

Planning material concerning Cambridge's St.Matthews area was considered to identify building attributes which may be evaluated differently by different population groups. For example, the Mill Road and St.Matthews Conservation Area Appraisal (City of Cambridge, 1999) included:

> Item 4.78: "The prominent chimneys and pots are a vital part of the character of the street."
>
> Item 6.10: Relative to extensions to traditional buildings' the document commented: "The choice of materials and appropriate detailing, can be a vital factor in helping a new building or extension to relate well to its setting. ...the general pattern is for buildings to be of gault brick..., with painted timber windows and doors set back into openings and roofs of natural slate."

But, to what extent is the importance of such building elements as roofscapes and streetscapes shared by various elements in the community? Do all residents assess them in the same manner? If development is to occur, what are acceptable alternative forms? In this experiment, the responses will give some insights into how different groups in the population might regard different building elements, regardless of the opinions of conservation professionals.

Fourth Section

The fourth section asked for information about the respondent, including the socio-economic indicators of occupation, extent of education, and foreign travel. Nationality was requested to allow the separation of people whose origins were not in the United Kingdom, and whose background may lead them to have different attitudes and preferences than the indigenous population.

While anonymity was part of the survey process, the forms were marked in batches of twenty, so that it was possible to identify the sections of streets from which each response came.

Exhibit 5.5: Copy of survey questionnaire

CONSERVATION AREAS PROJECT

The Martin Centre for Architectural and Urban Studies,
University of Cambridge, 6 Chaucer Road, Cambridge, CB2 2EB

NEIGHBOURHOOD CONSERVATION ATTITUDES AND EXPECTATIONS

The Conservation Areas Project is investigating community attitudes about neighbourhoods and heritage values, and what design controls might be appropriate in areas such as yours. We are interested in your opinions about your street, what features of the design of the existing houses are important to you, and what your thoughts are about how the local authority might act to ensure neighbourhood quality.

Research such as this helps better decisions to be made about the future of our urban areas. In order to assure anonymity, we are requesting that you do not provide your name or address.

Please indicate the extent to which you agree or disagree with the following statements:

	Strongly Disagree	***Disagree***	***Neither***	***Agree***	***Strongly Agree***
I feel that this area is of special architectural interest.	❑	❑	❑	❑	❑
I feel that this area is of special historical interest.	❑	❑	❑	❑	❑
I agree that the City should control the exterior design of houses in this area very carefully.	❑	❑	❑	❑	❑
I believe that a mix of uses, including non-residential uses, is desirable, and I would like to see them retained in the area.	❑	❑	❑	❑	❑
I believe that any new building in the area should look as much like the old ones as is possible.	❑	❑	❑	❑	❑
I believe that new buildings in this area should be roughly the same size and shape as the existing houses, (no matter what 'style' is used).	❑	❑	❑	❑	❑
It is the front of the houses which is most important in establishing the visual quality of our neighbourhood, so what rear additions are like is unimportant.	❑	❑	❑	❑	❑
I would accept new modern-style houses, provided their design was of high enough quality.	❑	❑	❑	❑	❑
I would give consideration to the design of the surrounding houses if I was to alter my house.	❑	❑	❑	❑	❑
I am happy to accept additional control on what I might do to my house, because it will also control what other people in the street might do to their houses.	❑	❑	❑	❑	❑

Please circle as many words as you feel apply to your street the way it is now:

exciting	solid	drab	interesting	old-fashioned	light	contemporary	
prestigious	low-status	dark	clean	noisy	friendly	spacious	
unpleasant	unfriendly	impressive	dirty	unimpressive	pleasant		
pretty	safe	uniform	motley	mixed	intimidating	ugly	impersonal
stylish	dramatic	unsafe	bland	restrained	elegant	dated	
traditional	timeless	flimsy	cheap	flashy	boring	expensive	
familiar	austere	distinguished	eccentric	uninteresting	nondescript		
agreeable	messy	well-proportioned	scruffy	quiet	crowded		

d04

CONTINUED ON OTHER SIDE

*Please check what are to you the **four most important** items which you think the planning system should control for renovations to existing houses. Please also indicate the **four least important** things.:*

	4 Most Important	4 Least Important	
Painting of brick exteriors (over existing unpainted brick	❑	❑	
Rooflights (skylights)	❑	❑	
Rendering of exteriors (over existing brick).	❑	❑	Check Four
Satellite dishes (small ones installed on the front of houses)	❑	❑	Items in
Utility meter boxes on the front of the house .	❑	❑	Each
Rooftop solar collectors	❑	❑	Column
Dormer windows in the front roof	❑	❑	
Dormer windows in the rear roof	❑	❑	
Exterior paint colours (example: colours of doors and window frames)	❑	❑	
Front door replacements (example: replacing wood doors with glass or metal)	❑	❑	
Additions to the rear of the houses (assume they are reasonable in size)	❑	❑	
Glazing (glass type) (replacement of original irregular glass with new plate glass, for example in double glazing)	❑	❑	
Roof materials (example: replacing natural slate with artificial slate)	❑	❑	If you have never
Chimneys: brick structure (example: removal of chimney)	❑	❑	thought about these
Chimneys: chimney pots (example: removal of chimney pots)	❑	❑	matters ,you might
Unsympathetic window replacement	❑	❑	like to go outside and
Hedges and fences in front of the house	❑	❑	look down your street
Type of brick in rear additions (example: use of non-matching brick colour)	❑	❑	and consider what you see.
I do not believe the planning system should control any of these things:		❑	

General Information:

Age: 15-19 ❑ 20-24 ❑ 25-29 ❑ 30-39 ❑ 40-49 ❑
50-59 ❑ 60-69 ❑ 70-79 ❑ 80-89 ❑ 90+ ❑

Male ❑ Female ❑

Occupation: _____ (include former occupation if retired)

Nationality: _____ Residency in this street: _____ years

Age at which full-time formal education was completed:
14 or under ❑ 15-16 ❑ 17-18 ❑ 19-21 ❑ 22-24 ❑ 25 or over ❑ Still at school ❑

Over the past ten years how many times have you travelled outside of the United Kingdom:
None ❑ 1-2 times ❑ 3-4 times ❑ 5-10 times ❑ 11-15 times ❑ Over 15 times ❑

Is this form being completed jointly, by two or more people? Yes ❑ No ❑

Do you own or rent? Own ❑ Rent ❑ Live with Relatives ❑ Other ❑
Do you have a car? Yes ❑ No ❑
Is the house divided? No ❑ Yes, into flats ❑ Yes, into rooms ❑

When complete, please return the survey form using the attached Freepost envelope:

Cambridge Conservation Areas Project,
The Martin Centre for Architecture and Urban Studies,
The University of Cambridge,
6 Chaucer Road, Cambridge, CB2 2EB

Thank you for your interest and assistance. Feel free to include any other comments.

5.3.3 Survey Distribution

A distribution of 457 surveys was undertaken between July and September 1999. These were delivered to 'traditional' houses in the area. Infill multi-unit housing was not surveyed, however new houses inserted into the traditional terraces were included. An envelope with a University of Cambridge 'Freepost' address was included for the returns.

A further 107 surveys were distributed in November 1999 in certain similar streets on the south-west side of Mill Road. This area, while not strictly a part of North St.Matthews, is continuous with it, was contained in the conservation area appraisal documents, contains the same type of housing, and has a shared history.

5.4 SURVEY RESULTS AND ANALYSIS

The data was assembled and analysed using SPSS 9.0 for Windows.

5.4.1 Level of Response

(a) Response by street

A total of 266 questionnaires were returned, representing an overall rate of response of 39.7 per cent, although on parts of some streets over sixty percent of surveys were returned. On one section of Gwydir Street more surveys were returned than were distributed, suggesting that the degree of interest was such that one or more individuals photocopied the questionnaire for completion by other household members. Exhibit 5.6 shows response rates by street which ranged from 18.8 per cent on Ainsworth Street to 44.0 per cent on Gwydir Street, and 47.7 per cent in South St.Matthews.

Exhibit 5.6: Response rates by street

		Distributed	Returned	% Returned
1	Gwydir St	182	80	44.0%
2	Kingston St	56	21	37.5%
4	Sturton St	94	40	42.6%
5	Hooper St	20	8	40.0%
6	Ainsworth St	32	6	18.8%
7	Perone St	20	6	30.0%
8	Norfolk Terrace	43	11	25.6%
9	Milford St	20	7	35.0%
10	Blossom St	13	3	23.1%
11	York Terrace	25	11	44.0%
12	York St	20	7	35.0%
13	Edward St	20	5	25.0%
14	Norfolk St	18	7	38.9%
	Sub Total	563	212	37.7%
15	S. St.Matthews	107	51	47.7%
	Unknown		3	
	TOTALS	670	266	39.7%

(b) Response by Tenure

The differences in response rates appeared to best correspond to different distributions of home ownership and rental through the area. The 1991 census indicated that 49.7 per cent of the North St.Matthew's housing stock was owner-occupied, and 32.7 per cent was private rental. In that no multiple unit local authority housing or housing association stock was included, this implies that approximately 65 per cent of the surveys would have been delivered to owner-occupied houses, and 35 per cent to dwellings which were privately rented. As 82.9 per cent of the total responses were from owner-occupiers, a response rate of approximately 48.9 per cent from home-owners, and 18.3 per cent from renters occurred. Not surprisingly, owner-occupiers expressed a much greater interest in their street (Exhibit 5.7).

Exhibit 5.7: Tenure indicated by respondents

TENURE		Total Responses	Owner-Occupied	% Owned
1	Gwydir St	80	63	78.8%
2	Kingston St	21	19	90.5%
4	Sturton St	40	37	92.5%
5	Hooper St	8	5	62.5%
6	Ainsworth St	6	6	*100.0%*
7	Perone St	6	5	83.3%
8	Norfolk Terrace	11	6	54.5%
9	Milford St	7	5	71.4%
10	Blossom St	3	3	*100.0%*
11	York Terrace	11	11	100.0%
12	York St	7	5	71.4%
13	Edward St	5	5	*100.0%*
14	Norfolk St	7	6	85.7%
	Sub Total	212	176	83.0%
15	S. St.Matthews	51	42	82.4%
	TOTALS	263	218	82.9%

(c) Response By Education, Travel, Residency and Occupation

Upon initial analysis, the great diversity of responses elicited was quite apparent. Nevertheless, some distinct population groups were equally evident. These groups were clearly (i) those people who were characteristic of the 'old economy' inhabitants of the area twenty-five years ago or more, (ii) younger individuals with lower educational attainment and not in professional, managerial or skilled technical employment, (iii) the individuals who were younger, better educated and typically who had lived in the area for less than twenty years, who were representative of the 'new economy' in Cambridge, (iv) a group of individuals who could be identified by very high educational attainment, considerable travel and usually professional occupations, (v) school teachers, and (vi) students. Accordingly, the responses were analysed according to these groups (Exhibit 5.8).

The members of the 'old economy' were identified by possessing four out of the five following characteristics;

Over age 40;
Left full-time school before age 17;
Made less than 5 foreign trips in the previous ten years;
Not now in, or previously in (if retired) professional, managerial, or skilled technical employment;
Over 25 years residency in the area.

While the older residents tended to be members of the 'old economy' group this was not universally the case; two of the three octogenarian responses were from academics, who offered responses more characteristic of the younger groups.

The 'old economy' responses represented 9.9 per cent of the total responses. In 1991, 19.4 per cent of the classified, working heads of households, were engaged in manual skilled occupations, partly skilled occupations, and unskilled occupations, a marked decrease from 38.3 per cent in 1981. Given an expected continued decline in the 'old economy' population, it appears that their response rate was not dissimilar to the overall rate.

The 'new economy' group were defined as having all of the five characteristics:

Under age 60;
Attended full-time school after age 17;
More than 5 foreign trips in the previous ten years;
Currently in professional (lower level), managerial, or skilled technical employment;
Less than 25 years residency in the area.

A 'high achiever' group was classified on the basis of having three of the four following characteristics:

Over age 30;
Education beyond 25 years of age;
More than fifteen foreign trips within the past ten years;
Managerial, professional, or high-level technical occupation.

Members of traditional high-earning professions, primarily physicians and lawyers, were included in this group, regardless of travel or education, provided they were aged over 30.

Exhibit 5.8: Classification of respondents

		Number	Percent
1	Old Economy	23	8.68%
2	Younger Old Economy	18	6.79%
3	New Economy	109	41.13%
4	High Achievers	37	13.96%
5	Teachers	27	10.19%
6	Students	10	3.77%
7	Older high education	7	2.64%
10	Foreign origins	9	3.40%
11	Other	11	4.15%
12	Unknown	12	4.53%
13	Older middle education???	2	0.75%
	Total	265	

Cluster analysis on the basis of the Likert scales and on the important elements to control was undertaken on the sample set, as an attempt to confirm the apparent boundaries of these groups. The analysis failed to reveal clear, coherent clusters, however placed most of the members of the old economy group in clusters of one or two respondents as outliers of the main population.

5.4.2. Analysis of Responses

On parts of some streets, the response rate would have created a virtual enumeration of home-owners. Moreover, it might be expected that those responding represent the most concerned and active element in the areas surveyed, so contain the opinion leaders. In contrast, the low response from the renters demonstrates their lesser interest: if they come to dislike the neighbourhood, they can move elsewhere - as could their Victorian predecessors. The home-owners have a considerable social and financial interest in their neighbourhood.

(a) Adjective Choices

The adjective choice set yielded a summary of the opinions held by the residents to their neighbourhood. A great range of perceptions of the neighbourhood was revealed through the adjectives selected by the respondents to describe their neighbourhood; every adjective except 'flashy' was chosen at least once. The main population groups showed differences in the pattern of adjectives they selected. Exhibit 5.9 shows the twelve most used adjectives for each group. Significant statistical differences in opinion (sig. < .05) occurred between the three demographic groups for twenty of the fifty-two tested adjectives. Important differences included 'low-status', while it was selected by a third of the old economy group, none of the new economy group did so. While 20.5 per cent of the new economy group selected 'pretty', no one in the old economy group did so.

The 'old economy' group, in general, portrays an undesirable neighbourhood, one which is unimpressive, of low status, dated, impersonal, and noisy. In complete contrast, the 'new economy' group depicts a friendly, pleasant, interesting, safe and quiet, if traditional and old-fashioned community. The high achievers showed a result similar to the new economy group, although perceive the area to be drab and noisy.

Exhibit 5.9: Adjectives most frequently chosen to describe area

	Old Economy		*New Economy*		*High Achievers*		*Older Higher Education*	
	N=	23	N=	109	N=	37	N=	7
1	old-fashioned	69.6	traditional	70.4	old-fashioned	40.5	interesting	71.4
2	traditional	65.2	friendly	63.0	agreeable	40.5	friendly	57.1
3	unimpressive	43.5	pleasant	61.1	traditional	40.5	pleasant	57.1
4	dated	43.5	agreeable	58.3	mixed	40.5	restrained	57.1
5	noisy	34.8	interesting	52.8	familiar	37.8	agreeable	57.1
6	friendly	34.8	familiar	43.5	interesting	35.1	well-proportioned	57.1
7	uninteresting	30.4	safe	43.5	safe	32.4	safe	41.8
8	low-status	26.1	quiet	43.5	friendly	32.4	familiar	41.8
9	familiar	26.1	old-fashioned	38.9	noisy	29.7	old-fashioned	41.8
10	quiet	26.1	well-proportioned	36.1	drab	29.7	uniform	41.8
11	uniform	21.7	solid	34.3	pleasant	27.0	solid, clean,	28.6
12	scruffy	21.7	mixed	26.9	crowded	21.6	pretty, mixed, traditional,	
					quiet	21.8	quiet (28.6% each)	

In order to quantify the strength of positive/negative attitudes within the different population groups, positive adjectives were identified through a further survey of thirty-five Cambridge residents. These individuals were asked to assess each of the adjectives employed in the survey, as strongly positive, positive, neutral, negative, or strongly negative, when used to assess houses or streetscape. This

allowed the identification of positive adjectives, which were defined as those which scored one standard deviation or more above the neutral point: eliminating adjectives which are simply descriptive, or have more than one possible interpretation.

The level of usage of positive adjectives by each group is contrasted in Exhibit 5.10, which shows the percentage of all of the adjectives which were selected which were 'positive'. Exhibit 5.9 underlines the negative attitude towards the neighbourhood held by the 'old economy' respondents, however the 'high achievers' were also less likely to highly esteem the area than the 'new economy' group. The mean use of positive adjectives, as a proportion of all adjectives used, is expressed in Exhibit 5.10.

Exhibit 5.10: Use of positive adjectives by different groups (chart)

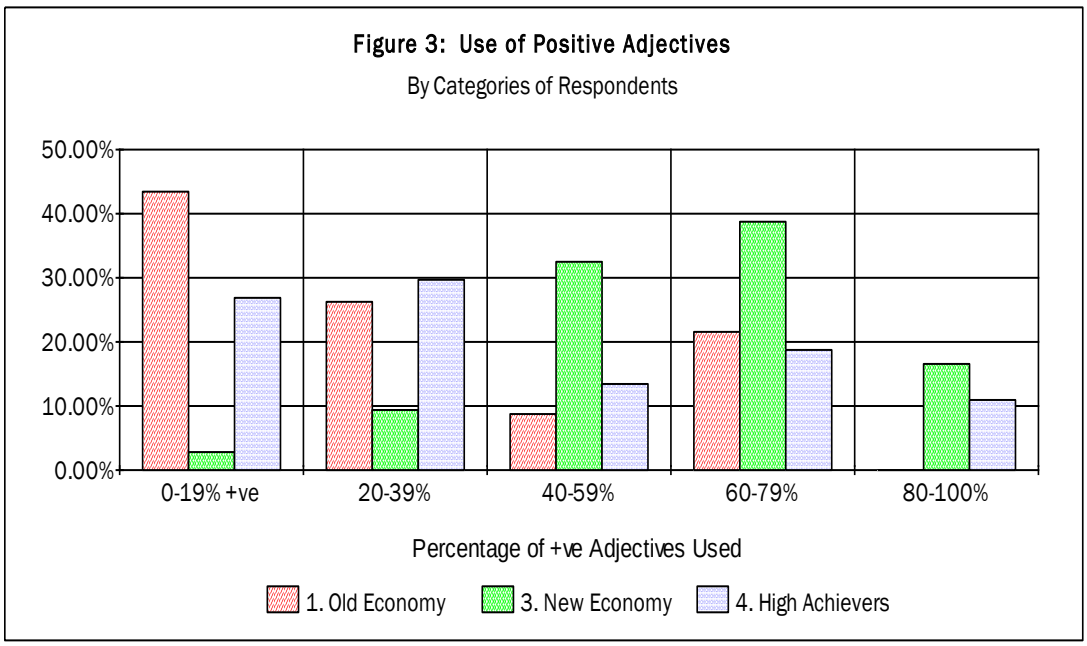


Exhibit 5.11: Use of positive adjectives by different groups (table).

			Standard
Old Economy	26.90	23	24.99
Younger O.E.	57.83	17	22.03
New Economy	60.87	108	20.79
High Achievers	37.97	37	28.88
Teachers	57.69	27	23.11
Students	40.88	10	30.55
Older High Education	49.80	7	17.21
Foreign/short residency	67.72	9	21.00
Other	50.93	11	26.84
Unknown	46.79	11	28.70
Older Middle Education	90.91	2	12.86
Total	52.53	262	26.22
ANOVA: df between groups	10		
df within groups	164	F= 7.672	
df total	174	sig< 0.000	

(b) Planning Policy Responses

Exhibit 5.12 shows the responses of the three primary resident groups to the planning statements. Differences between the groups are exhibited: generally the old economy group is less likely to believe the area is worthy of designation as a conservation area: only 27.3 per cent agreed that it is of special architectural interest, while 78.7 per cent of the new economy group and 51.4 per cent of the high achiever group agree. Interestingly, the old economy group tend to believe that the area is of historical, rather than architectural interest, a difference which is not shared by the new economy or high achiever group. Significant differences can also be noted relative to acceptance of mixed uses, whether they would consider their surroundings if altering their house, and the acceptance of design control.

Exhibit 5.12: Responses to planning policy matters by main socio-economic groups

Scale: Stongly Disagree (1), Disagree (2), Neither (3), Agree (4), Strongly Agree (5)	Old Economy	New Economy	High Achievers		ANOVA Sig
This area is of special architectural interest.					
N=	22	108	37		
Mean =	2.770	3.980	3.320	F=	5.153
Agree/Strongly Agree	27.3%	78.7%	51.4%	sig.	0.000
Disagree/Strongly Disagree	45.5%	5.6%	27.0%		
This area is of special historical interest.					
N=	23	108	37		
Mean =	3.300	4.030	3.300	F=	3.352
Agree/Strongly Agree	43.5%	81.5%	51.4%	sig.	0.000
Disagree/Strongly Disagree	21.7%	4.6%	27.0%		
The City should control the exterior design of houses in this area very carefully.					
N=	23	108	37		
Mean =	3.780	4.29	3.760	F=	2.358
Agree/Strongly Agree	73.9%	88.9%	64.9%	sig.	0.011
Disagree/Strongly Disagree	13.0%	2.8%	18.9%		
A mix of uses, including non-residential uses, is desirable, and I would like to see them retained in the area					
N=	22	105	36		
Mean =	3.230	3.840	3.920	F=	2.102
Agree/Strongly Agree	59.1%	79.1%	77.8%	sig.	0.048
Disagree/Strongly Disagree	36.4%	17.1%	13.9%		
Any new building in the area should look as much like the old ones as is possible.					
N=	23	107	37		
Mean =	3.700	3.490	3.110	F=	1.329
Agree/Strongly Agree	65.2%	56.1%	46.0%	sig.	0.215
Disagree/Strongly Disagree	17.4%	28.0%	43.2%		N.S.
New buildings in this area should be roughly the same size and shape as the existing houses, (no matter what 'style' is used).					
N=	23	107	37		
Mean =	3.480	3.57	3.410	F=	0.522
Agree/Strongly Agree	60.9%	64.5%	56.8%	sig.	0.837
Disagree/Strongly Disagree	26.1%	21.5%	27.0%		N.S.
It is the front of the houses which is most important in establishing the visual quality of our neighbourhood, so what rear additions are like is unimportant.					
N=	23	107	36		
Mean =	3.040	2.770	2.700	F=	0.903
Agree/Strongly Agree	43.5%	37.6%	27.0%	sig.	0.531
Disagree/Strongly Disagree	43.5%	53.2%	56.8%		N.S.
I would accept new modern-style houses, provided their design was of high enough quality.					
N=	23	107	36		
Mean =	3.350	3.45	3.420	F=	
Agree/Strongly Agree	65.2%	67.3%	66.7%	sig.	0.928
Disagree/Strongly Disagree	26.1%	23.2%	22.2%		N.S.
I would give consideration to the design of the surrounding houses if I was to alter my house.					
N=	23	108	37		
Mean =	3.350	4.200	4.110	F=	3.376
Agree/Strongly Agree	52.2%	91.7%	89.2%	sig.	0.000
Disagree/Strongly Disagree	26.1%	4.6%	0.0%		
I am happy to accept additional control on what I might do to my house, because it will also control what other people in the street might do to their houses.					
N=	23	108	37		
Mean =	3.260	4.040	3.700	F=	1.983
Agree/Strongly Agree	56.5%	88.9%	73.0%	sig.	0.036
Disagree/Strongly Disagree	30.4%	4.6%	13.5%		

The ranking of building elements to control is included in Exhibit 5.13. As might be expected from the differences in regard the three primary groups have for the area, a similar disparity exists between the responses to various building aspects to control.

Exhibit 5.13: Important and unimportant building elements to control

MOST IMPORTANT TO CONTROL

	Old Economy	*New Economy*	*High Achievers*	*Older, Higher Education*
N=	23	108	37	7
Paint Brick	52.2%	25.9%	24.3%	14.3%
Roof Lights	4.3%	2.8%	0.0%	0.0%
Rendering	47.8%	61.1%	51.4%	28.6%
Satellite Dishes	21.7%	42.6%	45.9%	57.1%
Utility Meters	26.1%	17.6%	16.2%	14.3%
Solar Collectors	4.3%	3.7%	5.4%	14.3%
Front Dormers	13.0%	22.0%	32.4%	28.6%
Rear Dormers	17.4%	5.5%	0.0%	14.3%
Exterior Paint	30.4%	5.6%	5.4%	0.0%
Front Doors	17.4%	43.5%	27.0%	57.1%
Rear Additions	43.5%	18.5%	21.6%	0.0%
Glazing	4.3%	7.4%	2.7%	14.3%
Roof Materials	17.4%	6.5%	10.8%	14.3%
Chimneys	0.0%	7.4%	13.5%	0.0%
Windows	34.8%	76.9%	67.6%	85.7%
Hedges & Fences	8.7%	7.4%	0.0%	0.0%
Rear Brick	17.4%	20.4%	13.5%	14.3%
Control None	21.7%	2.8%	8.1%	0.0%

MOST IMPORTANT TO CONTROL

Rank	*Old Economy*	*New Economy*	*High Achievers*	*Older, Higher Education*
1	Paint Brick	Windows	Windows	Windows
2	Rendering	Rendering	Rendering	Front Doors \
3	Rear Additions	Front Doors	Satellite Dishes	Satellite Dishes/
4	Exterior Paint	Satellite Dishes	Front Dormers	Rendering \
5	Windows	Paint Brick	Front Doors	Front Dormers /
6	Utility Meters	Front Dormers	Paint Brick	Paint Brick \
7	Satellite Dishes	Rear Brick	Rear Additions	Rear Brick |
8	Rear Dormers \	Utility Meters	Utility Meters	Roof Materials |
9	Roof Materials |	Rear Additions	Rear Brick \	Rear Dormers |
10	Rear Brick |	Hedges & Fen\	Chimneys /	Glazing |
11	Front Doors /	Glazing |	Chimney Pots \	Utility Meters |
12	Front Dormers	Chimneys /	Roof Materials /	Solar Collectors/
13	Hedges & Fences	Roof Materials	Solar Collectors \	
14	Roof Lights \	Exterior Paint	Exterior Paint /	
16	Solar Collectors /	Solar Collectors	Roof Light \	
17	Chimneys \	Roof Light	Rear Dormers |	
18	Chimney Pots /	Chimney Pots	Hedges & Fences/	

LEAST IMPORTANT TO CONTROL

Percentage of Respondents Selecting Building Aspect

	Old Economy	*New Economy*	*High Achievers*	*Older, Higher Education*
N=	17	83	34	7
Paint Brick	13.0%	13.9%	10.8%	0.0%
Roof Lights	26.1%	39.8%	37.8%	28.6%
Rendering	4.3%	2.8%	0.0%	0.0%
Satellite Dishes	30.4%	3.7%	5.4%	14.3%
Utility Meters	13.0%	7.4%	10.8%	28.6%
Solar Collectors	13.0%	25.0%	43.2%	14.3%
Front Dormers	13.0%	8.3%	16.2%	14.3%
Rear Dormers	26.1%	45.0%	48.6%	57.1%
Exterior Paint	17.4%	38.0%	32.4%	42.9%
Front Doors	30.4%	7.4%	10.8%	14.3%
Rear Additions	26.1%	28.7%	29.7%	42.9%
Glazing	4.3%	20.4%	21.6%	14.3%
Roof Materials	26.1%	27.8%	5.4%	42.9%
Chimneys	34.8%	10.2%	5.4%	28.6%
Chimney Pots	13.0%	25.9%	8.1%	28.6%
Windows	4.3%	1.9%	2.7%	0.0%
Hedges & Fences	17.4%	30.6%	32.4%	0.0%
Rear Brick	8.7%	16.7%	29.7%	14.3%

LEAST IMPORTANT TO CONTROL

Ranking of Least Important Building Aspects

Rank	*Old Economy*	*New Economy*	*High Achievers*	*Older, Higher Education*
From Most Mentions as Unimportant to Control				
1	Chimneys	Rear Dormers	Rear Dormers	Rear Dormers
2	Satellite Dishes \	Roof Lights	Solar Collectors	Roof Materials \
3	Front Doors /	Exterior Paint	Roof Lights	Rear Additions /
4	Rear Dormers \	Hedges & Fences	Exterior Paint \	Roof Lights \
5	Rear Additions |	Rear Additions\	Hedges & Fences/	Utility Meters |
6	Roof Lights |	Roof Materials/	Rear Additions \	Chimneys |
7	Roof Materials /	Chimney Pots	Rear Brick /	Chimney Pots /
8	Exterior Paint \	Solar Collectors	Glazing	Satellite Dishes\
9	Hedges & Fence/	Glazing	Front Dormers	Solar Collectors |
10	Paint Brick \	Rear Brick \	Utility Meters \	Front Dormers |
11	Solar Collectors |	Paint Brick /	Front Doors |	Front Doors |
12	Front Dormers |	Chimneys	Paint Brick /	Glazing |
13	Utility Meters |	Front Dormers	Chimney Pots	Rear Brick /
14	Chimney Pots |	Front Doors \	Roof Materials \	
15	Rear Brick /	Utility Meters /	Satellite Dishes |	
16	Glazing \	Satellite Dishes	Chimneys /	
17	Windows |	Rendering	Windows	
18	Rendering /	Windows	Rendering	

Although the new economy respondents, in the planning questions, deny that the facades are the most important aspect of overall visual quality, their list of important control items is dominated by

streetscape attributes, even as they demand flexibility to modify and expand their houses. The old economy group has a very different position: it ranked control of rear additions as third in importance.

5.5 DISCUSSION

The study found clear differences between the attitudes of different groups to the St.Matthew's area. In particular, the newer arrivals, who can be identified through education, employment, foreign travel, and age, have a greater concern for the aspects of the housing which would be associated with the socio-aesthetic aspects of buildings - that is, the public face (streetscape), while the older groups are more interested in what would be associated with the functional attributes. This is consistent with the lower level of esteem accorded to the neighbourhood by the older population: from a strictly functional perspective, the houses are small, many of them have small gardens, and parking is limited.

5.5.1 Esteem of Neighbourhood

Relative to the thesis, the most interesting responses are those contrasting the expressions of overall esteem of the neighbourhood by those population groups which typify the occupants of three or four decades ago, to those who have moved in more recently.

Clearly most 'traditional' working-class residents have a relatively low regard for the neighbourhood. The mean use of positive adjectives by the 'old economy' respondents was 26.9 per cent, while it was 60.0 per cent for the 'new economy' residents. The 'old economy' respondents will remember when nearby areas were slum cleared and when the area was full of low status, poorly equipped houses. The persistence of beliefs over time, even in the face of obvious change, is supported by this outcome. Most of the old economy inhabitants have not changed their attitudes, even as the area has undergone significant physical and social transformation.

The means of positive adjective use by education and travel, rise steeply, level off, then fall for the groups with the highest amount of education and travel (Exhibit 5.11). One might hypothesise that people with high levels of education, who can afford more than one foreign trip per year, aspire to a better neighbourhood, but cannot afford it in high-priced Cambridge. It could be suggested that there can be a severe lack of congruence between the housing which people find themselves occupying, and the way they see their objectives. Expressed otherwise, while a decision to purchase was made, the consequences were either originally unsatisfactory, or became unsatisfactory at some point, perhaps as the family unit matured, or became more affluent. Alternatively, a very high level of education and foreign travel may cause one to rate the neighbourhood lower on the basis of a better knowledge of alternative urban forms. One respondent noted on her form, a recent trip to

Barcelona, and commented on the "inventiveness and playfulness" in architecture she saw there; and that "Victorian terraces seem deadly by contrast!!" This presence of a large high achieving group may be one way in which Cambridge is atypical, however it may point to future national pressures; rising aspirations may become increasingly demanding about community quality and dwelling attributes.

What is interesting about the overall level of esteem given to the neighbourhood is the marked differences between the groups. The way the occupants view this one specific neighbourhood does vary between identifiable market segments.

5.5.2 Rejection of Products of Parents' Generations

The issue of rejecting the products of one's parent's generation might be noted in the responses. The older respondents, would have been born during or just after the First War, and may associate Victorian housing with their parents' generation. The older members of the survey expressed a rejection of the area. However, education seems to be an important mediator. The older respondents with middle and higher levels of education generally offered responses more like the younger, educated groups, than like their less-well educated age cohort (Exhibit 5.11). The limited number of responses in this group, make wider generalisation difficult (and to expand the survey would mean going out of the area), however they suggest that while the rejecting of the built products of one's parents' generation may be at work, it is heavily influenced by other considerations, perhaps including familiarity. Of course, most of the higher-educated older respondents are also relatively new to the area.

5.5.3 Aspects of Buildings to Control

Notwithstanding the responses to the question about whether the house front is the most important aspect of visual quality, the new economy respondents' list of important control items indicates that they actually want to preserve the streetscape, while demanding the flexibility to expand their houses. Accordingly, they gave low ranking of importance to control over rear dormers, roof lights and rear additions. This can be readily understood in the context of the Cambridge-centred housing market: the production of new housing is limited by the greenbelt, by the historical nature of the city, the awkward road network, and planning controls. The city's existing stock contains relatively few large houses, and some have been divided into student accommodation. For the home owners in St.Matthews, a loft conversion or a rear extension is a much cheaper option than purchasing a larger house; many of the families in the study area may see the purchase of a larger house, in Cambridge, as financially impossible, even in the longer term.

The old economy group has a very different position: it ranked control of rear additions as third in importance. This might be considered in light of the renovation survey (Chapter 7), in which it was found that manual workers were less likely to substantially renovate their houses than higher income groups. One might hypothesise that this response is based on them being unlikely to want to expand their houses, and that some decades ago such expansion was uncommon, especially given a high level of rental. This might explain why protection of light, view, and protection from overviewing, are more important to them.

Control of satellite dishes was of importance to 44.6 per cent of the new economy group, but to only 17.6 per cent of the old economy group. This may result from the difference in esteem accorded to the street; the new economy respondents presumably being concerned with the connotations of unintellectual social status which might be implied by a proliferation of antennae. In contrast, the new economy group accept solar collectors (one array of which is in a very prominent location at the end of the longer streets), which although perhaps visually more obtrusive, may be seen as symbolic of environmental responsibility.

During the survey process, a few telephone inquiries were received from people in the neighbourhood. One asked for advice about a planning problem, which reflected the issues of the changing nature of consumer regard for houses and neighbourhoods. An older, long-term resident was concerned about his neighbour's proposed loft conversion. This would put a large dormer on the back of the house, and the older resident was concerned that it overlooked his garden. He was incensed that his neighbour would not even contemplate asking the city to put it on the front of the house (something he acknowledged the City would probably not allow). This conflict illustrates the difference in attitudes between the two groups.

5.5.4 Mixed Uses

The responses about mixed uses also would support a change in expectations about residential neighbourhoods. The old economy group was found to be relatively unamenable to a mix of uses; 47.1 per cent disapproved of non-residential uses, contrasting with 19.0 per cent for the new economy group, and 15.6 per cent for the high achievers. In particular, a very vehement segment appeared: 17.6 per cent of the 'old economy' respondents strongly disagreed with retaining the existing mix of uses, contrasting with 8.9 per cent of the new economy group, and none of the high achievers. This diminishing concern with neighbourhood uniformity might be based in a familiarity with live/work arrangements among the younger, more affluent households, a greater confidence in their social and economic status, or the fact that 'mixed use' means something different to more recent cohorts. The old economy group may feel that 'good' neighbourhoods, perhaps of the status to which they once aspired, and as portrayed in suburban visions offered through most of this century by home-marketers and planning theoreticians, promised an escape from industrial

neighbours and rarely included such uses. Matthews (1999, p.155 and 175] discussed archaeological work done relative to poorer housing of mid-19th century Chester. Evidence of smithies, button-making, nail making, and, apparently, cat-skinning (for glove making) was found immediately adjacent to residences. Such activities with their attendant noise, waste, and other noxious emissions, would be undesirable neighbours, reducing the utility of surrounding dwellings - suggesting one possible reason why the oldest group was unamenable to mixed use. They may be reflecting attitudes based on the experience they had when children, or passed on by their parents, of mixed-use meaning something deleterious, rather than a computer programmer or financial consultant. As noted, the oldest residents expressed, through their choice of adjectives, attitudes about the neighbourhood which are more consistent with its state thirty years ago: it is likely that attitudes about Victorian mixed uses also survive.

5.5.5 New Development by the Old Economy Group

The old economy group approach to the community is characterised by greater individualism, and less regard for the streetscape as a whole. Only 52.9 per cent would consider the nature of their surroundings if they were to modify their own dwelling, contrasting with 90.1 per cent of the new economy group, and 85.7 per cent of the high achiever group. The old economy group was also far less accepting of additional controls; presumably because they generally don't esteem the area as highly as other groups, they will value the benefit (control of other people's unfortunate developments) less, relative to the cost (control over their possible development activities).

Many houses in St.Matthews have had front doors replaced with doors which are undoubtedly deplored by the city's conservation interests. While the two younger groups rank control of front doors as highly desirable, it was ranked very low amongst the old economy group. This may suggest that the incidence of unfortunate door replacement may be on the decline, as the population of the area continues to change.

It is perhaps fortunate that individuals in the old economy group are unlikely to want to undertake extensive redevelopment of their properties: they see less value in their neighbourhood, are less interested it, and their sense of what elements are important differs from that of the newer population.

5.6 IMPLICATIONS

The dramatic differences in opinion offered suggests one reason for an ongoing change in the population composition. The low esteem given by the 'old economy' group suggests that they will bid less than the 'new economy' for the houses, presumably bidding relatively more for some other house type, thereby hastening their departure from the area. Andrews (2001, p.212) agreed that "individuals vote with their feet, sorting themselves into places whose bundles of attributes they like

better." The younger people with 'old economy' characteristics tended to resemble the 'new economy' respondents more than their own predecessors. Whether this is because that group tends to, as a whole, have attitudes similar to the new economy respondents, or because this is a specific sub-sample, which 'voted with their feet', and are willing to pay the premium involved to live in the area, could be subject to further exploration.

5.6.1 Stewardship of the Housing Stock

The overall esteem levels and the aspects of the houses valued, leads to an understanding of how recent refurbishment activities have proceeded. A higher level of esteem suggests that people should be more willing to invest in the maintenance and improvement of the houses. The notion that the streetscape is important and should be protected suggests that few new residents will undertake 'improvements' which would be dramatically out-of-keeping with the buildings, with imitation stone facades, slab front doors, or picture windows, in the way their parents and grandparents did. Exhibit 5.14 shows work done in June 2001 to remove rendering from the exterior of one of the bay-fronted houses on Gwydir Street. Such an attitude towards historical authenticity is in marked contrast to that of the people who would have originally had the rendering applied.

Moreover, the freedom to expand the houses, without compromising the streetscape is of obvious importance. This, together with the expressed esteem among the 'new economy' group, indicates a willingness to invest in the building stock of the area, thereby decreasing the likelihood of future 'obsolescence'.

5.6.2 Implications to Regulators

Significant differences were found between population elements, as defined by social and age cohorts. Opinions strongly voiced by one element may be very different than those held by other groups, and the planners must be careful to balance the competing viewpoints. Both politicians and local authority staff, must be careful to recognise that vocal complaints from one population segment cannot be used as a proxy for the majority opinion. In particular, a vocal and unhappy 'old economy' group ('I have lived in this area for forty years, and…'), could bias planning responses in ways inconsistent with the requirements of emerging population groups, thereby compromising the viability of the area.

5.6.3 Longer term issues

This survey represented the St.Matthews area in mid 1999. A major transition in how people regard the area has occurred, which suggests that the current state of opinion may not be permanent. However, some aspects suggest that attitudes may be more stable in the future. The shift of opinions showed significant correlations with rising education, occupational classification, and

foreign travel. However, the greatest change of opinion was associated with the rise in formal education from age 14 to 17. Yet, 24.4 per cent of the respondents were educated past age 25, which suggests that continued education-based change will only occur until the 'old economy' residents have all disappeared.

5.7 CONCLUSIONS

It is only a few decades since various levels of government undertook to demolish areas which, like North St.Matthews had they survived, would now be esteemed and protected. Conservation area legislation is framed as if government were protecting such areas from the depredations of residents, which was in keeping with prevailing attitudes when the legislation was created. A group of educated bureaucrats, planners, and architects could see value in areas in which 'old economy' residents, might see little. At that time, the residents, if they saw fit to 'improve' their poorly-esteemed houses at all, would have rendered them, and installed 'picture windows' and slab front doors, as 'modernisation'. Now, it is apparent that changed attitudes are driving the maintenance and refurbishment process in neighbourhoods such as St.Matthews.

While it may be argued that St.Matthews has undergone a process of 'gentrification', it is unreasonable to expect populations, hence opinions, in neighbourhoods to be static. As groups, which may be defined by education, employment, or ethnicity, move through neighbourhoods, different expectations will likely emerge over time. In particular, the evidence of St.Matthews suggests that in the U.K., rising educational attainments, and decreasingly dependence upon manufacturing employment, should result in widespread increases in appreciation for traditional neighbourhoods - at least for their streetscapes.

Exhibit 5.14: Removal of rendering from a house in North St.Matthew's Summer 2001

6.0 HOUSE PRICES AS EVIDENCE OF IMPACT OF CHANGING CONSUMER ATTITUDES AND PREFERENCES:

6.1 OBJECTIVES

The two consumer surveys indicate that attitudes and preferences towards different house types are not static, but evolve in a manner which is, comprehensible, and perhaps predictable. If such is the case, some measurable impact on the marketplace should be detectable. In McFadden's 'Path Diagram for the Consumer Decision Process' (Exhibit 3.1) such impacts represent 'consumer behaviour', which is the process output, suggested to be an observable construct. In the case of most products, this will be exhibited as a propensity to purchase, hence a widely-preferred product will tend to experience increased demand.

Some caution must be observed, as research has shown that there is no universal one-to-one correspondence between stated attitudes and preferences and resultant behaviour, however "...fairly impressive attitude-behavior correlations are sometimes observed" (Fazio, 1986, p.205). Ajzen and Fishbein (1980), in particular, demonstrated that attitudes could predict both behavioural intentions and behaviour, for such decisions as career choice and voting. Continuing the previous 'cola' analogy, a widespread increase in preference for sweet colas should be manifested in increased sales of that specific product. One would presume this to be the case for housing, however, housing's complexity, including the constraints on new supply, means that such a simple expression of increased preference is unlikely to be observable. Anas and Arnott (1991, p.3) found "...complexity and multidimensional heterogeneity...", associated with the multitude of ways utility is derived from houses. Nor is outcome strictly expressed in additional purchases: Tse and Raftery (1999, p.131) suggested that "...it is likely that the first response of a household is to increase consumption of housing services, by spending to improve the dwelling unit rather than moving." Investigations of these two forms of behaviour may confirm the impact of changing consumer housing preferences.

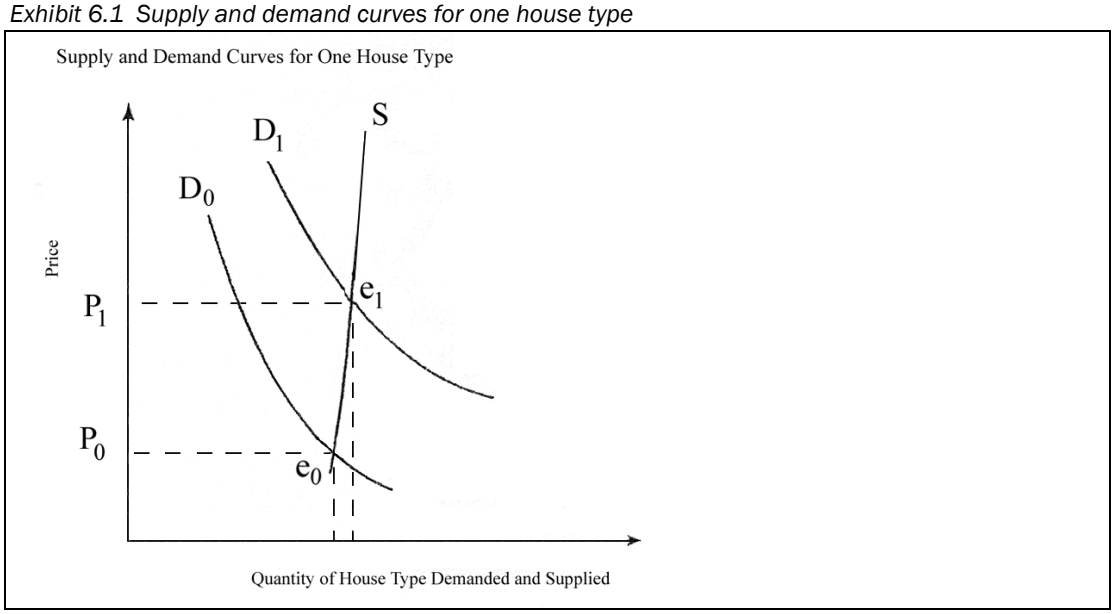
In particular, because the supply of houses of each type is constrained, part of this impact should be observable in relative price movement. Costello (1991, p.8) discussed some of the complexities and perversities of supply relative to market prices, summarising that "...demand for owner-occupation is invariably disproportionately reflected in rising prices rather than rising supply." In the case of most specific owner-occupied house types, supply is completely constrained, except for any net gains which increased prices may draw from the rental stock. For example, it is now impossible to build more genuine Victorian houses, although reproductions may provide near substitutes. Houses which consumers assess as desirable should increase in price relative to those which are seen as less desired. Nutt et al (1976, p.11) proposed that changes in desirability in relation to building ageing

processes, would be reflected in market prices, his hypothesis being that prices decline as 'obsolescence' occurs. This was explored empirically by Malpezzi et al (1987) within a hedonic pricing model. In the case of single house types, this relationship can be seen in terms of simple supply and demand curves, in which supply is dramatically constrained.

Using a simple supply and demand graph (Exhibit 6.1), when the esteem for a particular form of house, perhaps those built in the Interwar period, increases, its demand curve moves from D_0 to D_1. Given a virtually fixed supply S, the equilibrium point moves from e_0 to e_1 with a corresponding rise in price from P_0 to P_1, with at most, a minor increase in supply. If the owner-occupied housing stock is subdivided into distinct house forms which experience changing levels of consumer preference, relative price movements should be observable, both between different housing types and relative to the overall housing market. This simple logic underlies this investigation.

Accordingly, the objective of this investigation was to identify any differences in price behaviour between different house forms in the stock.

Exhibit 6.1 Supply and demand curves for one house type



6.2 PREVIOUS RESEARCH

Past studies into the determinants of house prices tend to focus on functional aspects of utility, including location and environmental factors, together with objectively measurable dwelling characteristics, such as floor areas, condition, amenities, and number of rooms. The previous experiments suggest that consumer assessments of less tangible 'socio-aesthetic' aspects of houses, should have increasing impact on prices.

Studies frequently reference 'other' factors, without developing them further. For example, McFadden (1978, p.76) used an all encompassing term 'dwelling characteristics'. Goodman and

Thibodeau (1995) acknowledged and discussed the importance of a factor they termed 'vintage effect', which intruded on their analysis of housing prices: "The vintage effect occurs when some unmeasured housing characteristic (for example, housing quality) is correlated with the year that a dwelling was built" (p.27). While this recognised that housing price models require a variable to reflect the nature and era of the design of the building, Goodman and Thibodeau nevertheless, still presented a traditional formula, as follows, as the basis for the creation of housing value, with any 'vintage effect' still treated as a subordinate and exogenous, element, contained within the error term.

$$V = f (L, S, N, P, t)$$

With the following parameters:

V = the inflation adjusted monthly cost of imputed rent for the owner-occupier.
L = land characteristics
S = the structural characteristics of a building (size, shape, condition,...)
N = neighbourhood variables (local tax regime, socio-economic status,...)
P = proximity variables (nearness to transport, schools,...)
t = period when information was collected

Given that the Attitudes and Preferences experiment found that the respondent consumers assessed and assigned esteem differently to the various distinct house types, and such esteem was mutable, the aggregation of different 'vintages' of houses within hedonic price models, implies the loss of an aspect of the setting of prices which would be of interest to the architect, planner, or investor.

An obvious way to explore for a 'vintage effect' should be to explore price elasticities for the different house types, however there are many methodological difficulties. The literature in this area spans a number of decades and includes hedonic models of different housing markets, some of which are compared in Ball (1973) and Malpezzi et al (1987). From these studies it is clear that no one universal elasticity reliably applies to all types of housing, in all markets, under all economic conditions. Accuracy is also debated. A group of studies, described by Ball (1973), found in their various regressions, R^2 measures of between .54 and .94, although Ball was highly critical of the methods used to obtain the higher values, and about the impact of preferences held by different socio-economic groups, as well as levels and distributions of income (p.231). Tse and Raftery (1999) referenced a variety of studies which found income elasticities ranging from .1 to .94, although most studies placed it in the upper part of that range. Ermisch, Findlay, and Gibb (1996), suggested that U.K. housing has an income elasticity of approximately 0.5, and critiqued a variety of studies relative to sources of bias, finding various treatments of taxes, expected capital gains, and service utilisation, concluding in their study: "Even if all the variables are correctly specified there is still doubt as to whether there exists one price or income elasticity for the entire sample or population." (Ermisch et al, 1996, p.67). Maclennan (1977) cautioned about the shortcomings in then-current research into house prices, notably that the complexities of consumer utility functions

had not been fully explored, in particular the role of "behavioural fashion" (p.64), and that this lack of understanding of consumer groups which might hold differing preferences undermined static regression-type house price models.

It is not universally agreed what specifically should be included in the calculation of housing costs, even once it is assumed that an owner-occupier essentially pays rent to himself. Housing is a composite good, which includes imputed or real rent, council tax, water and sewerage charges, and, more peripherally, such things as furniture and appliances (Anas and Arnott, 1991, p.3). This is logical: if, for example, gas prices rise, consumers will have fewer resources to allocate to the other components of overall housing services. The high transaction costs in the form of moving costs, legal fees, stamp tax, agents' fees, and family disruption, also might be subject to inclusion in models. Of particular importance, relative to different 'vintages' of houses, is that varying levels of maintenance costs, or expected maintenance costs, might affect market prices. A declining real cost of electricity and gas through the late 1980s and 1990s will also have had an effect, by reducing the differences in operating costs experienced by energy-efficient and inefficient houses.

In considering absolute elasticities over the past twenty-five years, two factors must be included in any model: the effective cost of owner-occupied housing based on fluctuating costs of debt service and its tax treatment. For example, the basic building society mortgage rate fell from 15.4 per cent in the second quarter of 1990 (Financial Statistics, Central Statistical Office) to 6 per cent in mid 2001. As reported in the FPD Savills' *U.K. Residential Research Bulletin*, in the third quarter of 2000, the average loan taken by a first time buyer was 78.8 per cent of the house price, and 65.1 per cent for other buyers. Donner (2000) discussed the significant impact that Mortgage Interest Tax Relief, and its gradual disappearance has had through the Postwar period as a form of subsidy to home owners. In the mid 1970s, the national impact of residential mortgages was 65 per cent of what nominal interest rates would have suggested (Boleat, 1991).

Consumer expectations about the future are also important because of the long-term nature of a housing commitment. As housing plays a major role in family finance and other decisions, it is likely to be treated differently than additional purchases of cola. Therefore, absolute income levels may not be an appropriate measure. Tse and Raftery (1999, p.124) stated: "It has been suggested that households with higher expected future incomes may tend to spend more than those with lower future income expectations, even if their current incomes are the same." Therefore, in an era of economic expansion, when people believe they will be wealthier in the future, they are likely to behave as if their incomes are higher than the statistics would indicate, thereby exaggerating elasticities. Presumably in troubled economic times, the opposite would occur. Owner-occupied housing also embeds an investment aspect. Therefore a changed belief in the potential for a capital gain upon sale of the house, should change behaviour.

Accordingly, to compute absolute elasticities, a great number of assumptions are required. In particular, although changing mortgage rates and tax conditions can been incorporated in analyses, comparisons between time periods are still to be regarded with caution.

6.3 RESEARCH DESIGN AND PROCESS

The complexity surrounding house price elasticities confirms that attempts to create meaningful absolute numbers may be futile. Fortunately, the object of this research is to demonstrate differences between dissimilar house forms and eras of construction. Accordingly, only the relative differences between the price movements of different housing 'vintages' are important. The impact of methodological difficulties in the analysis are thereby minimised; it is only necessary that the different types are treated consistently.

6.3.1. House Price Data

Unfortunately, detailed housing price records over time are very difficult to obtain in the U.K. While estate agents do maintain records, various firms contacted proved to be either uninterested in the research, or regarded data, even forty years old, as being confidential. It is also uncompiled, and the estate agents contacted did not want to put the effort into extracting the appropriate data, or allow a researcher first-hand access to their records.

However, newspapers are available, in which advertisements are placed by estate agents and private vendors. As most of the consumer survey respondents were from within Cambridge's sphere of economic influence, the Cambridge marketplace was appropriate for consideration. The Cambridge Evening News has, since the early 1970s, been the major advertising media of the region's estate agents.

As a data source, advertisements have their own limitations. Over the decades, the Cambridge Evening News advertisements have become considerably clearer and more detailed, with most recent advertisements including a photograph, description, and street name. Prior to 1973 advertisements were very general, typically indicating only that the house was 'two miles from the city centre', with little or no indication of condition or age. This curtailed the compilation of data prior to the early 1970s. In order to use the data from the mid 1970s, which usually lacked photographs, it was necessary to consider only streets in which the houses are of one single form. Areas and streets were selected in which the houses (a) match the classifications used in the consumer survey experiments, (b) are geographically proximate, and (c) contain enough transactions to provide an ongoing account of house price evolution. Low numbers and unreliability of the earlier data required that caution must be used with the pre-1975 data.

The markets in Cambridge are subject to many factors other than the impact of consumer attitudes towards design type. In particular, locational preference can change over time. Accordingly, the best comparison is between different forms of houses which are located in close proximity. Queen Edith's and Coleridge wards of South Cambridge contain housing of every period of building between the 1870 and the 1990s. Some streets consisting entirely of interwar developer housing, are adjacent to streets consisting of Postwar (50-70s) developer housing, and in close proximity to streets of late Victorian housing. This means that price differences due to locational variation should be minimal. It might be argued that there may be changing locational preferences even between two adjacent streets. However, without an obvious cause, such differences may reflect changing relative preferences for the specific house types represented.

The property sections of the microfilmed newspapers were reviewed, and relevant house prices collected for the period between 1973 and 2001. The data was organised on a quarterly basis, in keeping with the index produced by Nationwide Building Society. Unfortunately, particularly in the earliest years, there are not always houses of each type advertised in the subject areas. However, the sampling process was done so that not more than two quarters separated any quarter for which data was collected. The offer prices for 927 proposed sales were included in a data base.

Data for five types of houses in the South Cambridge wards of Queen Edith's and Coleridge was assembled and compared. Photographs of typical houses are included as Exhibit 6.13.

Houses which did not conform to the standard types were not included. As the data was grouped on a quarterly basis, in each quarter there is a limited sample of houses in each area on offer. Also, on any street, even of uniform type, there is a range of house sizes and quality, due to refurbishments and dilapidation, so the price data tends to fluctuate on a short-term basis, reflecting the random selection of houses on the market at any time. An attempt was made to reduce any bias which might result from the researcher changing selection criteria over time, by starting with random selection of quarters through the study period, and subsequently filling in missing time sequences.

The 1950-70s developer offerings show greater individuality than the Victorian and Interwar houses. Accordingly, the data gathering concentrated on houses within certain specific contained, and uniform, neighbourhoods.

Selection of the houses inevitably embeds some error: (i) there is potential subjectivity on the part of the researcher, (ii) the source data is incomplete, (iii) the final transaction prices are unknown and (iv) sales which were not advertised are not included. During periods of high demand, houses can be sold before the advertisements appear, which usually means that the price is not shown. In the late 1980s prices spiralled and subsequently collapsed, a process which Balchin et al (1998, p.80)

noted as being particularly severe in East Anglia. Through the upwards spiral, it is apparent from the written comment in the property sections that houses were being sold at well above their advertised prices. However, in early 1990 house prices collapsed, not to regain the same levels for six to eight years: during the period immediately after the price collapse, houses appear, through newspaper comment, to have often sold for less than their advertised prices.

A map (Exhibit 6.12) indicates the areas for which data was collected. The following types of houses were the subjects of the primary analysis:

- Small Victorian houses with two or three bedrooms in the Romsey area (noted as Sm.Victorian (i)). These houses have been included because of the limited number of sales of small Victorian houses in the immediate area being considered.
- Small Victorian-worker-type terraces on Cowper Road, off Cherry Hinton Road (noted as Sm.Victorian (ii)). The Cowper Road and Romsey prices have a Pearson correlation coefficient of r=.966, which indicates that through the period under consideration, the two areas' prices have moved in concert. Accordingly, the Romsey area can act as a reasonable proxy for small Victorians in the immediate area under consideration;
- Bay-fronted Victorian and Edwardian houses (for simplicity noted as 'Large Victorians') to the south of Cherry Hinton Road, between Perne Road and Hills Road. Most of these houses are semi-detached. The smallest were excluded, and all in the analysis have three or four bedrooms.
- Interwar builder, bay-fronted, semi-detached, three bedroom houses, on various streets in the Perne Rd / Cherry Hinton Rd area;
- Three-bedroom terraced Postwar (1950-70s) houses on Derwent Close and Cherry Hinton Road;

6.3.2 Mortgage Data

Data on incomes and mortgage costs was also collected and used in the analysis. The issues of long-term declining real energy prices were not addressed.

It can be assumed that an owner-occupier effectively acts as both tenant and landlord, essentially paying rent to himself, by meeting the mortgage payments. This means that mortgage interest rates become of considerable importance in the effective cost of housing. It can further be assumed that consumers effectively mortgage all of the house price. This simplifying assumption is based on two pieces of logic: first, an individual consumer, when investing equity in a house, is foregoing the opportunity of investing in other people's mortgages; and secondly, the marginal acquisition of additional housing by an owner-occupier is likely to be financed through a mortgage. Historical basic building society mortgage rates were obtained from *'Financial Statistics'* (Central Statistical Office). Calculations, based on data provided in successive issues of *'Housing Finance*', generated net

mortgage rates, after the effect of MIRAS (Mortgage Interest Relief At Source).

6.4 ANALYSIS AND FINDINGS

6.4.1. Graphical Comparison of House Prices

The comparison of house prices within south Cambridge suggests that there has been definite relative change in prices, which is consistent with observed changing consumer attitudes and preferences, although this should not be taken to imply simple causalities.

Exhibits 6.2 and 6.3 show the offer prices for the five groups of houses, indexed respectively by the retail price index (to year 2000 currency) and by household income for the East of England region. The substantial increase in real prices in the late 1980s is quite apparent, together with the subsequent collapse, and a rising trend in the late 1990s. Indexation to household income relates house prices to income. Balchin et al (1998, p.81) noted that while since the 1950s the national house price to earnings ratio has typically been 3.3:1, and averaged 3.7:1 through the 1980s, it reached a high of 5.03:1 in 1989. However, prices do not reflect the real cost of housing to consumers.

On a RPI indexed basis, the prices of all house types increased over the study period, however not at the same rate. The Postwar (50-70s) houses increased very little in real terms (from the £60,000-£70,000 range in the early 1980s to £70,000-80,000 through the early 1990s, in year 2000 currency), while the elements of the Victorian stock increased in value considerably. At the beginning of the study period, the Postwar (50-70s) houses were second in price only to the Interwar houses, but through the 1980s gradually fell to last position. Until 1977, the large Victorians were in third place, ahead of only the small Victorians. The Interwar stock starts in first position, but falls behind the large Victorians in the early 1980s. Anecdotal information, obtained through the Attitudes and Preferences interviews and through newspapers, such as Hall (1999), suggested increasing esteem for Interwar houses. This was not obvious in the Attitudes and Preferences results, but can be observed in the last three years of price data.

Exhibit 6.4 demonstrates the impact of changing mortgage rates, allowing for the effect of mortgage interest tax relief (MIRAS-Mortgage Interest Relief At Source). This was calculated on the basis of current interest rates over six quarters, five behind, and one ahead, to allow for memory and anticipation of interest rates by consumers. The graph shows that in spite of increasing house prices through the 1990s, declining mortgage rates have meant that the cost of debt service has not increased to the same extent. Contrary to widespread popular belief, the real cost of debt service associated with the ownership of all but the larger houses, was not dramatically higher in the late 1990s, when compared with the 'pre-bubble' period of the 1980s.

Offer prices for nearby larger Postwar (1950-70s) houses were also collected. While the multiplicity of house sizes and designs in the area compromises accuracy, and the infrequency of house sales meant that only fifty-three offer prices were recognised, the decline in their value, relative to the large Victorians is clear. The relative difference between specific 'matching' house types is shown on Exhibit 6.5. In 1979 typical large Postwar houses sold for approximately twice the amount of a nearby large Victorian: now they sell for slightly less. This astonishingly large change was confirmed in discussion with area home-owners: while in nominal terms there have been large price increases throughout the Cambridge stock, owners of large Postwar (50-70s) houses complained that their house prices had not shared the increase to the same extent. The graph also compares the MIRAS-adjusted cost of debt service for the smaller Victorians included in the survey, showing a matching change in relative house prices.

House Price Graphs (1973-2001)

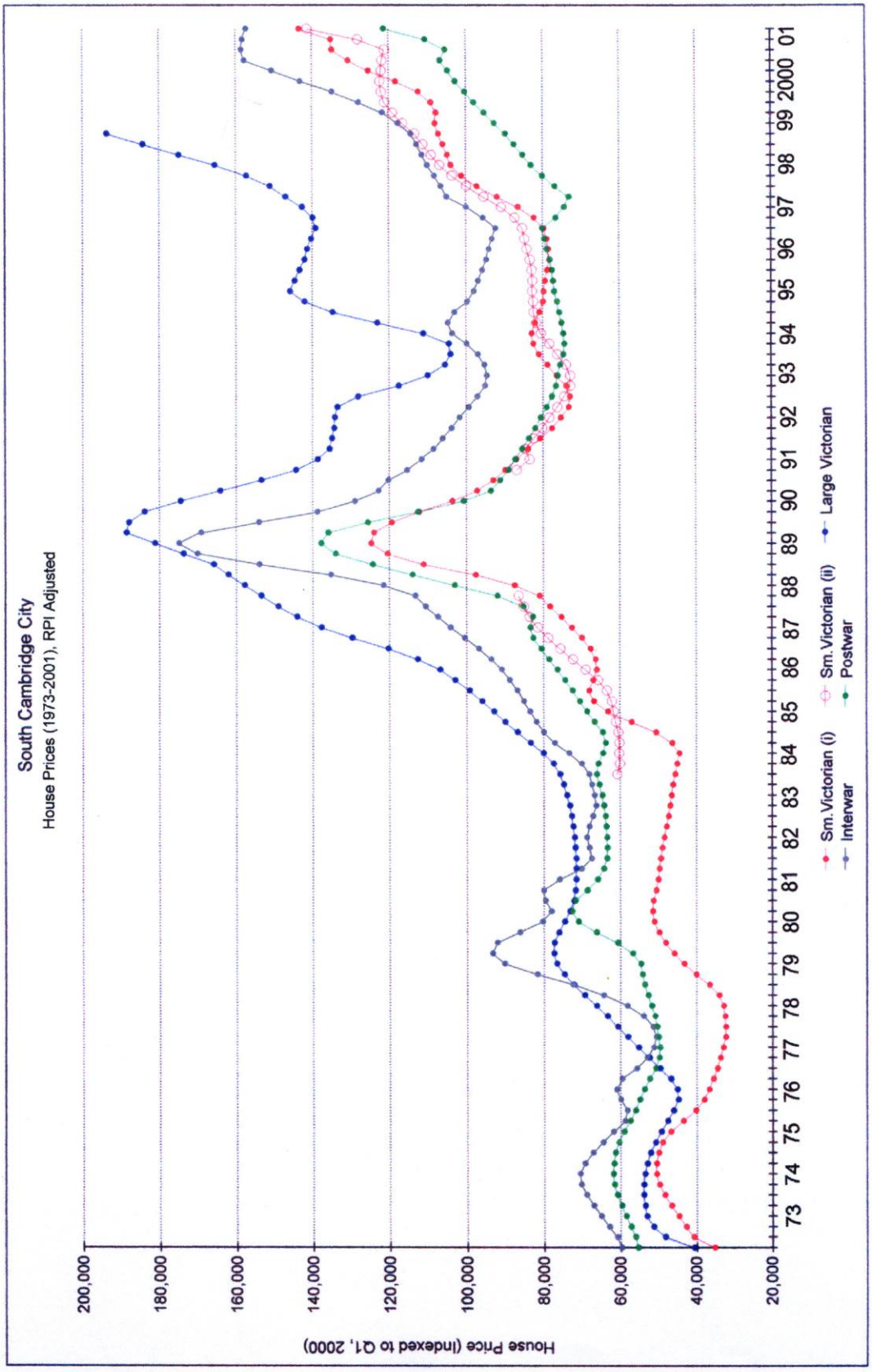
Exhibit 6.2: South Cambridge city: RPI adjusted offer prices for various house types

Exhibit 6.3: South Cambridge city: House offer prices indexed by mean household income

Exhibit 6.4: Debt service for various house types adjusted by MIRAS and RPI

Exhibit 6.5: Relative house occupancy costs (debt service), Postwar and Victorian houses in South Cambridge city

Exhibit 6.2: South Cambridge city: RPI adjusted offer prices for various house types



INSERT EXHIBIT 6.3

Exhibit 6.4: Debt service for various house types adjusted by MIRAS and RPI (RPI adjustment to year 2000 currency)

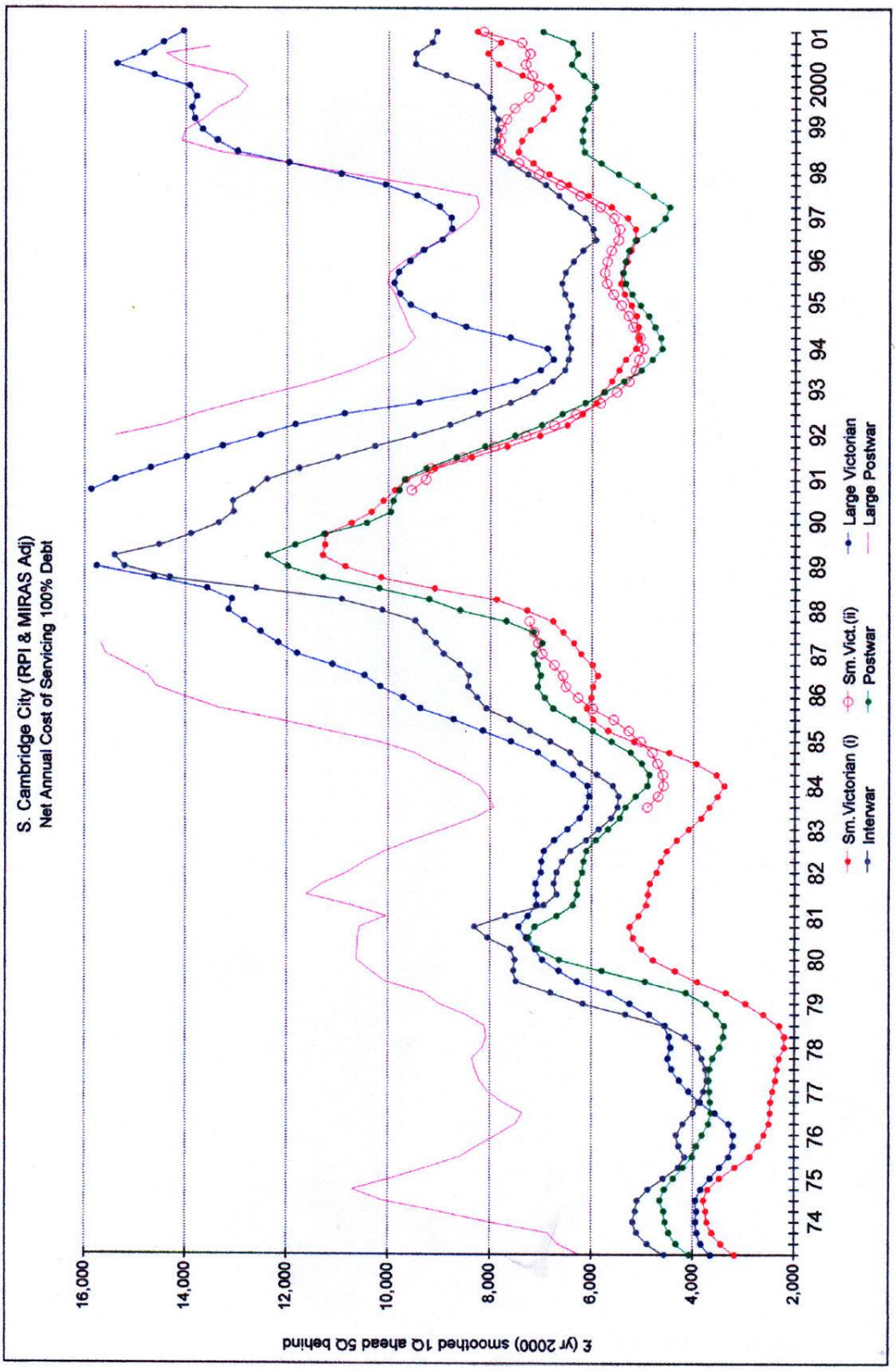


Exhibit 6.4: Debt service for various house types adjusted by MIRAS and RPI (RPI adjustment to year 2000 currency)

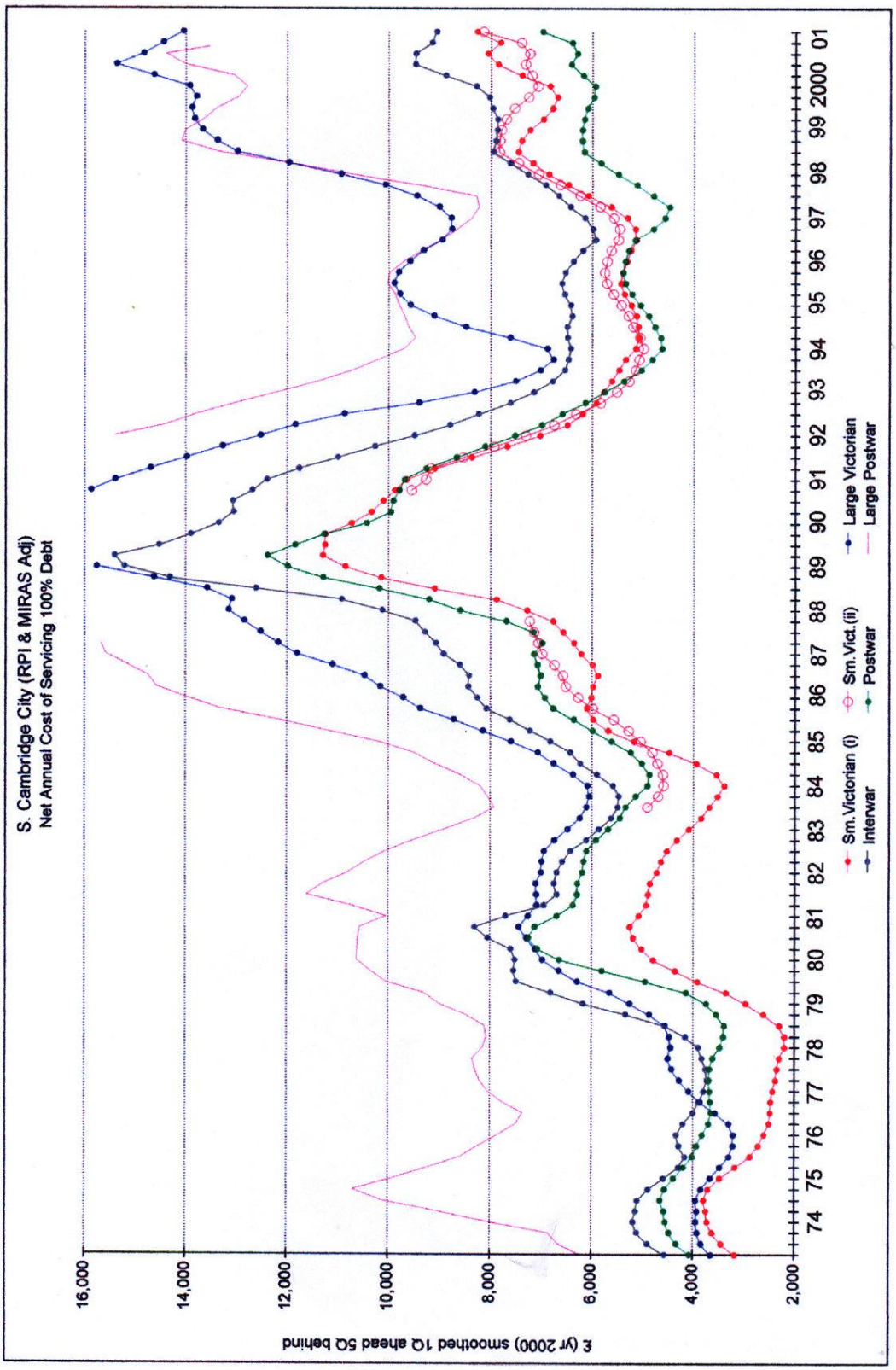
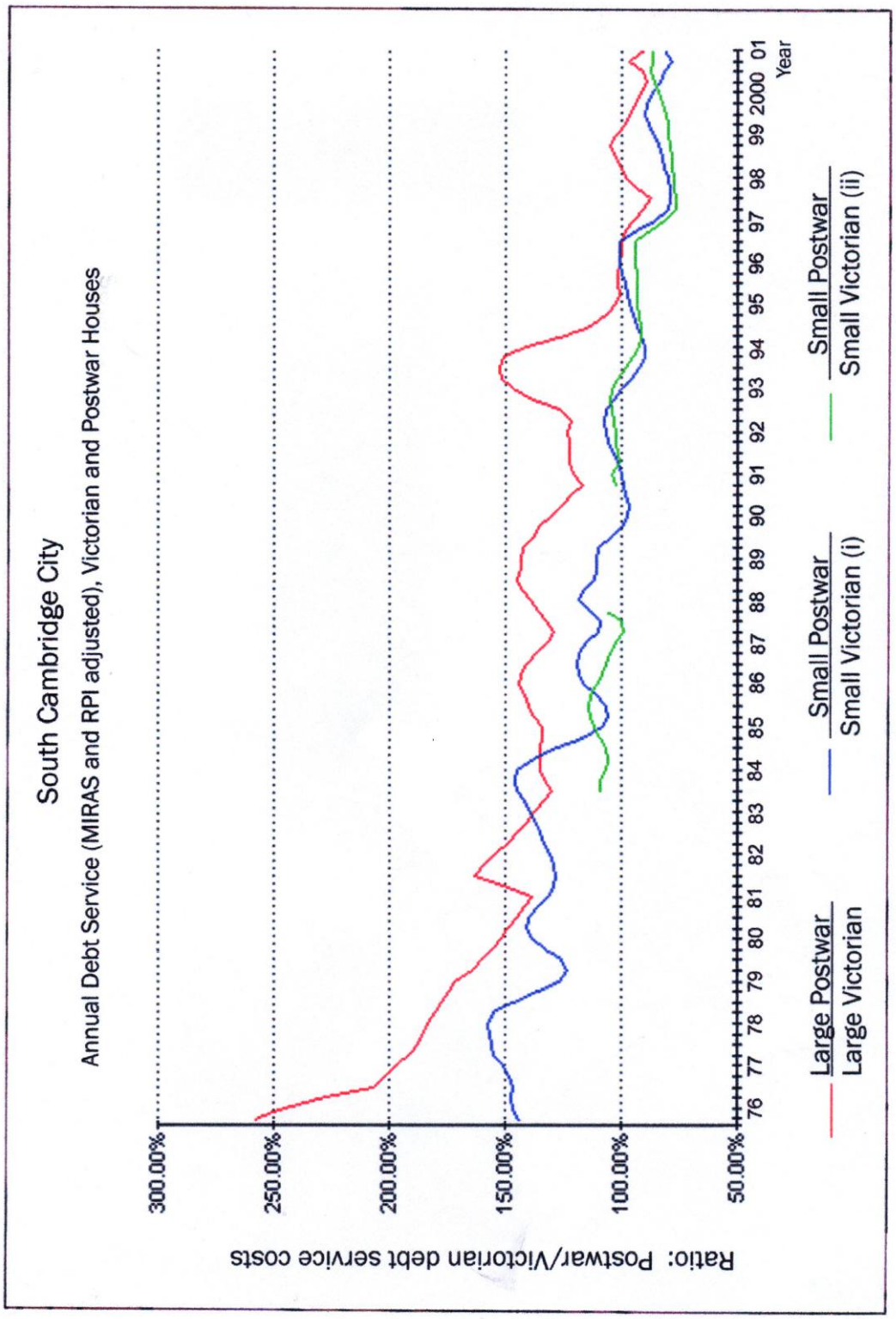


Exhibit 6.5: Relative house occupancy costs (debt service)
Postwar and Victorian houses in South Cambridge city



6.4.2. Quantitative Analysis of House Prices

From graphs alone, it is clear that prices for different housing vintages do not move in concert. Clear changes in rank occurred even between houses of similar sizes, on adjacent streets. Therefore a regression model based on an undifferentiated pool of house price data would yield misleading or sub-optimal results due to the effects of aggregation. Again, this confirms that there is little reason to accept a simple, universal model of prices, or a chronologically-based model of depreciating house values.

Given the numerous data and methodological issues in creating overall elasticities, absolute elasticities for houses should be suspect, however the changing prices of the houses, relative to indices and incomes can be explored. Two regressions were undertaken, relating prices of different 'vintages' of houses (i) to RPI-indexed income and (ii) to a house price index.

The data was divided into four periods:

1. 1973-1974: Data limited and of doubtful value;
2. 1975-1987: Pre-bubble;
3. 1988-1992: Bubble (boom and bust) While important, this period has been treated as an anomaly for the purposes of this discussion.
4. 1993-2001: Post bubble.

Accordingly, the analysis concentrated on the 1975-1987 and 1993-2001 periods, in order to quantify changes for the different house forms relative to (i) changes in a regional house price index, and (ii) changes in average income for the East of England. For the changes relative to average income, housing expenditure has been assumed to be the annual RPI indexed debt service, adjusted for the impact of mortgage interest tax relief, for 100 per cent of the mean offer price of the various house types.

It is clear that the Cambridge market area effectively extends ten to fifteen miles, or more, in each direction, with consumers throughout that area making trade-offs between travel time to employment, schools, shopping, and other Cambridge amenities, and the lower prices of houses further from the city. Furthermore, Cambridge is within commuting distance of London, so house prices may also relate to London's housing prices and incomes. This influences the choice of income and price indices.

(a) Changes in Consumer Housing Expenditure for Specific House Types, relative to House Price Index

The prices for the various house forms were compared with the two indices. The index of house prices for East Anglia, prepared by Nationwide Building Society and available on their website, was used as the basis for one comparison. Scatterplots of the relationship for the various house types are included as Exhibit 6.7.

A simple linear regression was conducted in SPSS to relate the price of each house type to the index:

$$P_{fp} = \alpha + \beta_f X_t + \varepsilon$$

Where:

P_{fp} = the predicted price of house form f relative to the index, at index price p;

α = a constant (y intercept)

β_f = the slope of the regression line for house form f relative to the index;

X_t = the mean price indicated by the index under consideration, at any time t;

ε = the error associated with the observation of P_{fp}.

The regression results are included as Exhibit 6.8. A further calculation was undertaken to relate the change in house price relative to the change in the price index. The implications of the analysis are summarised in Exhibit 6.6, which shows the relative changes at median price points during each of the two periods:

$$D_{fp} = \frac{\text{Percentage change in house price}}{\text{Percentage change in price index}} + \varepsilon$$

Where

D_{fp} is the ratio between percentage house price changes for a specific house form f at a specific index price level p, and

ε represents an error term.

Exhibit 6.6: Change in house prices relative to Nationwide index for East Anglia

Change in House Prices Relative to Nationwide Index for East Anglia

Calcuated at £38,000 index price for 1975-87 data.
Calcuated at £70,000 index price for 1983-2001 data.

$$Dfp = \frac{\text{Percent Change in Price for Specific 'Vintage'}}{\text{Percent Change House Price Index}}$$

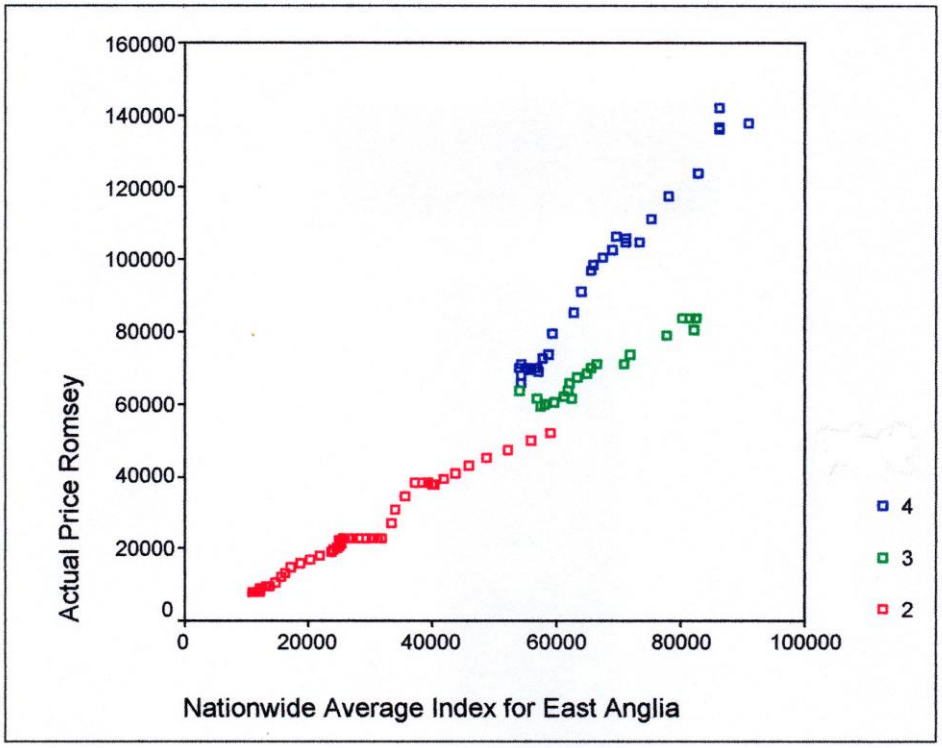
	1975-1987	1993-2001
Small Victorian (i)	1.10	1.48
Small Victorian (ii)	1.00	1.37
Interwar	1.01	1.28
Postwar (50-70s)	0.97	1.20
Large Victorian	1.19	1.85
Mean for Houses Sampled	1.05	1.43

It is immediately apparent that through the 1975-87 period, changes, relative to income, for the sample South Cambridge houses, as a whole, were only slightly ahead of those of East Anglia, however through the 1990s they experienced considerably higher increases. This is not unexpected, given the economic conditions in the Cambridge area. However, the differences in increases between house types are most apparent. The small Victorians, have had clear and long-term increases relative to the Postwar stock, and, to a lesser extent, the Interwar houses. In particular, the Postwar houses experienced poor performance, especially when contrasted with the small Victorian houses.

Exhibit 6.7: Scatterplots of house prices relative to Nationwide index

House Ask Prices in South Cambridge Relative to Nationwide House Price Index for East Anglia, 1975-2001

Period: 2: 1975-1987
3: 1988-1992
4: 1993-2001



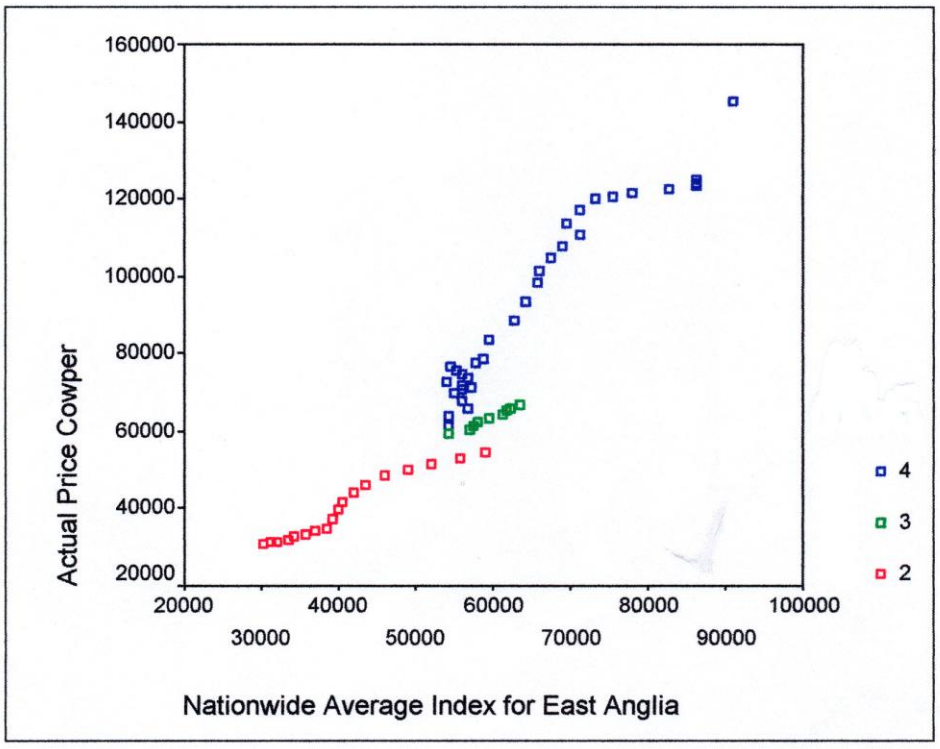
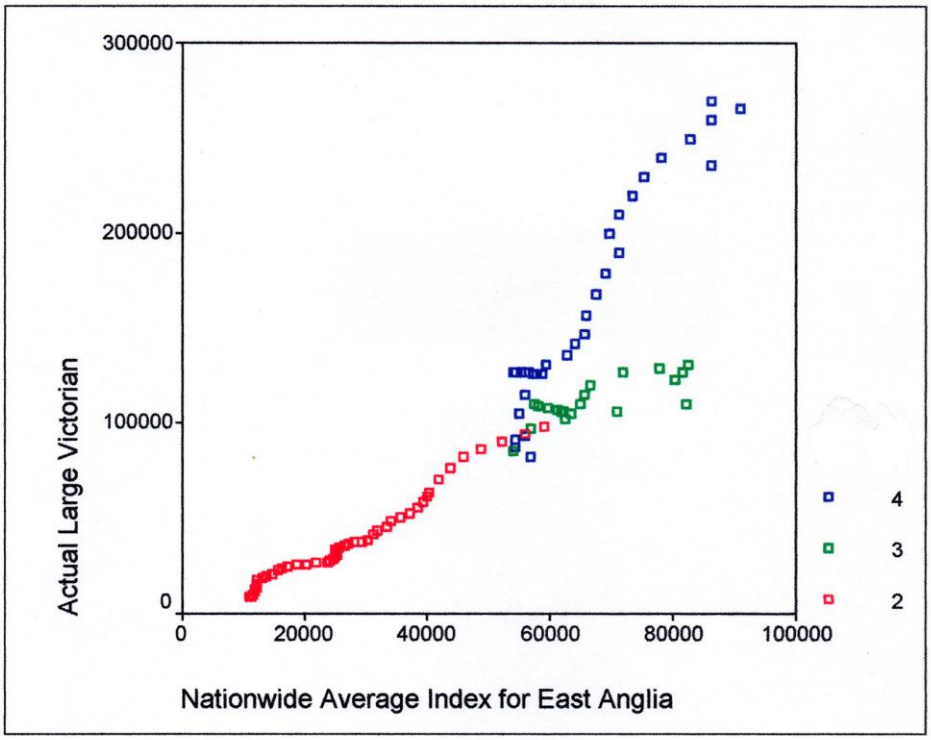


Exhibit 6.7: (continued)



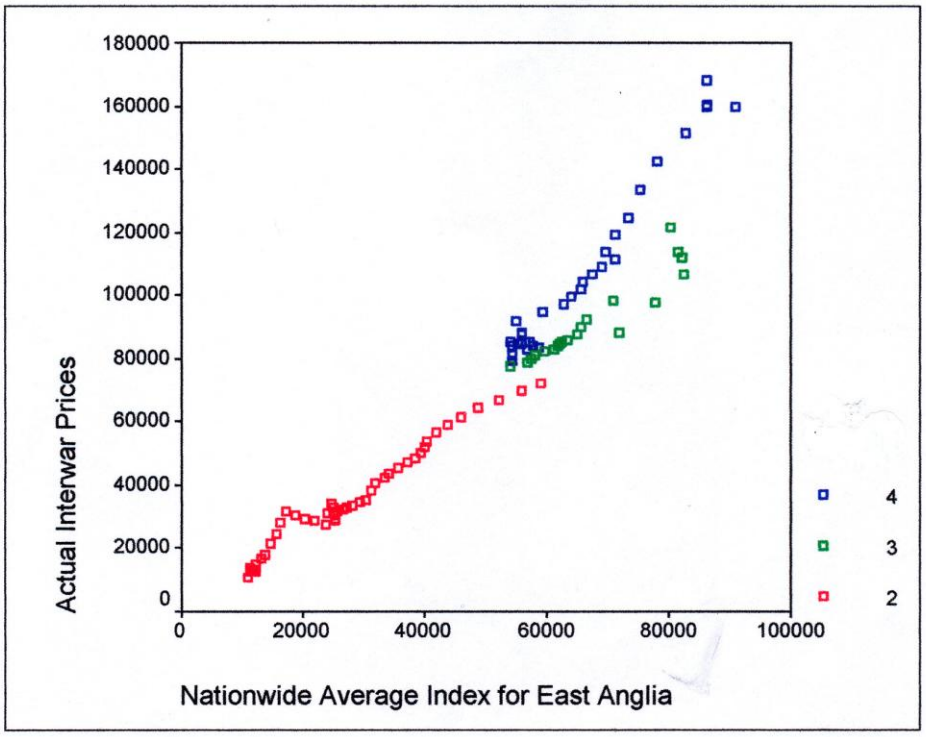


Exhibit 6.7: (continued)

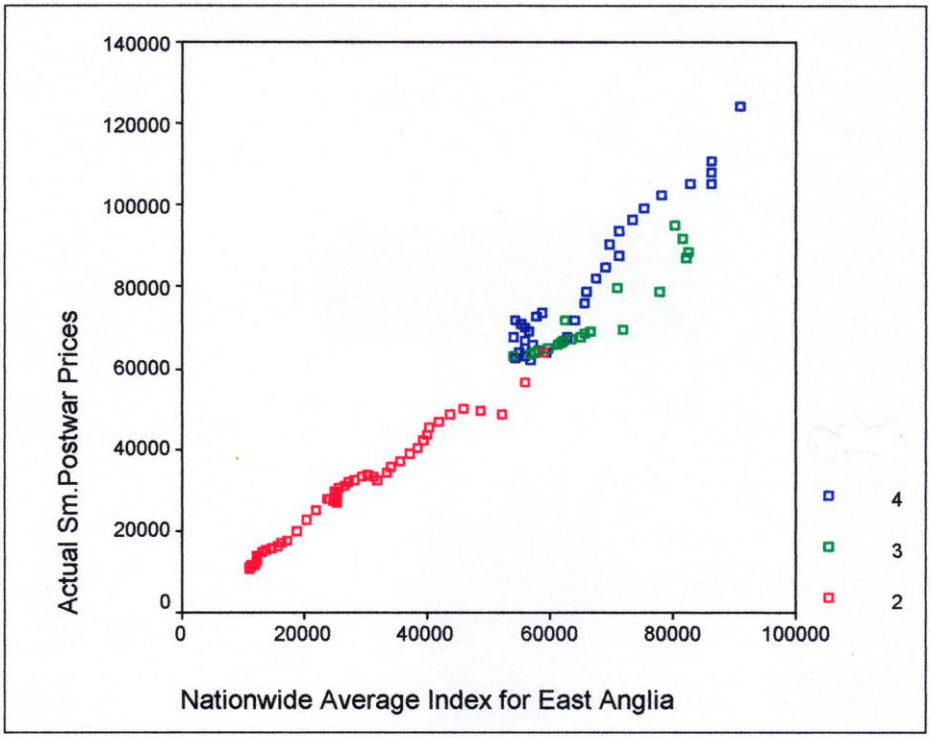


Exhibit 6.8: Regression Results: Prices of different house types and Nationwide index

CHANGES IN PRICES FOR DIFFERENT HOUSE TYPES RELATIVE TO NATIONWIDE PRICE INDEX
Regression Results
Dependent Variable: House prices for specific house types
Independent Variable: Nationwide Building Society average house price for East Anglia.

		PERIOD 2 Pre-Bubble 1975-87		PERIOD 4 Post-Bubble 1993-2001	
Small	Slope(B), 95%ci	0.9858	(.947-1.024)	2.1373	(2.026-2.249)
Victorian	Beta Standardized (slope)	0.9905		0.9900	
(Romsey)	Intercept/Std Error	-3,449.38	568.27	-48,400.39	3,634.22
	Adjusted R(sq)	0.9808		0.9795	
	ANOVA : F, sig	2,605.7668	0.0000	1,531.5978	0.0000
	Std Error of the Estimate	1,769.9250		3,503.3230	
	Slope 't', sig.	51.0467	0.0000	39.1356	0.0000
	N= (data points)	52		33	
Small	Slope(B), 95%ci	0.9855	(.835-1.096)	2.0050	(1.786-2.224)
Victorian	Beta Standardized (slope)	0.9891		0.9583	
(Cowper Rd)	Intercept/Std Error	22.12	2,574.60	-37,805.17	7,145.25
	Adjusted R(sq)	0.9353		0.9157	
	ANOVA : F, sig	246.7897	0.0000	348.6621	0.0000
	Std Error of the Estimate	2,139.5388		6,887.8937	
	Slope 't', sig.	15.7095	0.0000	18.6725	0.0000
	N= (data points)	18		33	
Intewar	Slope(B), 95%ci	1.29	(1.225-1.351)	2.40	(2.441-2.555)
Builder	Beta Standardized (slope)	0.99		0.98	
(Perne Rd)	Intercept/Std Error	-446.47	916.29	-50,410.93	5,072.07
	Adjusted R(sq)	0.97		0.97	
	ANOVA : F, sig	1,711.73	0.00	991.09	0.00
	Std Error of the Estimate	2,853.88		4,889.38	
	Slope 't', sig.	41.37	0.00	31.48	0.00
	N= (data points)	52		33	
Postwar	Slope(B), 95%ci	1.0293	(1.010-1.089)	1.4865	(1.349-1.624)
(1950-70s)	Beta Standardized (slope)	0.9713		0.9695	
Ch.Hinton Rd	Intercept/Std Error	1,204.44	578.36	-17,034.61	4,490.39
& Perne	Adjusted R(sq)	0.9824		0.9380	
Area	ANOVA : F, sig	2,850.4320	0.0000	485.2863	0.0000
	Std Error of the Estimate	1,801.3733		4,328.6509	
	Slope 't', sig.	53.3894	0.0000	22.0292	0.0000
	N= (data points)	52		33	
Large	Slope(B), 95%ci	1.8253	(1.733-1.918)	4.8272	(4.330-5.324)
Victorians	Beta Standardized (slope)	0.9845		0.9627	
(Qu. Ediths)	Intercept/Std Error	-10,832.31	1,352.64	-154,823.28	16,225.84
	Adjusted R(sq)	0.9686		0.9243	
	ANOVA : F, sig	1,576.7892	0.0000	391.9192	0.0000
	Std Error of the Estimate	4,212.9363		15,641.4070	
	Slope 't', sig.	39.7088	0.0000	19.7970	0.0000
	N= (data points)	52		33	

(b) Changes in Consumer Housing Expenditure for Specific House Types Relative to Changes in Average Income

An alternative way of expressing the data is relative to income. Scatterplots of the observed levels of expenditure on debt service relative to income, for the various house 'vintages', are included as Exhibit 6.10. Although caution must be used in comparing the different eras, it is apparent that regression lines plotted through higher-income portions of the graph (post 'bubble era') will yield lower slopes than for the lower (pre-bubble) income levels, particularly for the Postwar houses. The graphs show the role of the 'bubble': the rising side of the bubble was apparently a continuation of the previous price/income structure. Apparently, a housing price function at such a steep slope was ultimately unsustainable.

Cambridge and surrounding area has had a sustained economic boom through the 1990s, and while it might be expected that its average household income would have outstripped that of poorer areas of the East of England, such as Lowestoft and Yarmouth, or even areas within Cambridgeshire, such as the north Fenlands, data from 'Regional Trends' (CSO), does not confirm a growing gap, although there may be changes in income distribution. This suggests that use of the readily obtainable East of England / East Anglia income data, RPI adjusted, is appropriate for considering relative expenditure changes, but needs to be treated with caution relative to absolute measures.

A linear regression was conducted in SPSS to develop E_{fi} as might apply to each house type. This related, for each of the two main sections of time, the RPI and MIRAS-adjusted debt service on 100 per cent of the current house price, to RPI indexed income, to create a regression formula:

$$E_{fi} = \alpha + \beta_f I_t + \varepsilon$$

Where:

E_{fi} = the annual housing expenditure for house form f at income level, at mean income level i,

α = a constant (y intercept)

I_t = the average East of England Income, at any time t,

β_f = the slope of the regression line for house form f

ε = the error associated with the observation of E_{fi}

The regression results are included as Exhibit 6.11. A further calculation was undertaken to relate changes in house price expenditures to changes in the average annual income for East Anglia, as follows:

$$R_{fi} = \frac{\text{Percentage change in annual house price expenditure}}{\text{Percentage change in average annual income}} + \varepsilon$$

Where

R_{fi} is the ratio between percentage house expenditure change for a house form f at a mean East Anglian income level i, and

ε represents an error term.

Exhibit 6.9 summarises the implications to be drawn from the regression. It can be seen that as income has increased, the five different house forms show different behaviour in the marketplace.

Exhibit 6.9: Relationship of Consumer House Expenditures to Mean Real Income in the East of England.

Change in Housing Expeditures Relative to Changes in Real Income

Calcuated at £19,000 average income for 1975-87 data.
Calcuated at £24,000 average income for 1983-2001 data.

$$Rfi = \frac{\text{Percent Change in Annual House Expenditure}}{\text{Percent Change in Average Annual Income}}$$

	1975-1987	1993-2001
Small Victorian (i)	3.85	1.55
Small Victorian (ii)	3.62	1.48
Interw ar	3.07	1.25
Postw ar (50-70s)	2.90	0.98
Large Victorian	3.99	2.10
Mean for Houses Sampled	3.49	1.47

Price Increase Ratios:

Postw ar/Small Victorian(i)	75.31%	63.68%
Interw ar/Small Victorian(i)	79.80%	80.87%

(ii) Change in House Expenditures Relative to Income

Change Relative to Change of Mean Above (five) House Forms

	1975-1987	1993-2001
Small Victorian (i)	110.5%	105.1%
Small Victorian (ii)	103.8%	100.5%
Interw ar	88.2%	85.0%
Postw ar (50-70s)	83.2%	66.9%
Large Victorian	114.4%	142.5%

** When mean for 'market' of sample houses rises by 1%, Small Victorian prices rise by 1.029%.

Different house 'vintages' can be seen to have different elasticities relative to household income. Moreover, the slopes are not constant over time. It is apparent both from the calculations, and from the scatterplot (Exhibit 6.10), that the relationship between income and expenditure changed with the collapse of the late 1980s house price bubble.

An indicator of the change in esteem for various house types can be noted in Exhibit 6.4. Whereas before the 'bubble', annual RPI-indexed consumer expenditures for a Small Victorian were approximately £2000 less than for a Small Postwar, more recently the house expenditures have been roughly equivalent.

Exhibit 6.10: Scatterplots of house debt service expenditures relative to average incomes in the East of England

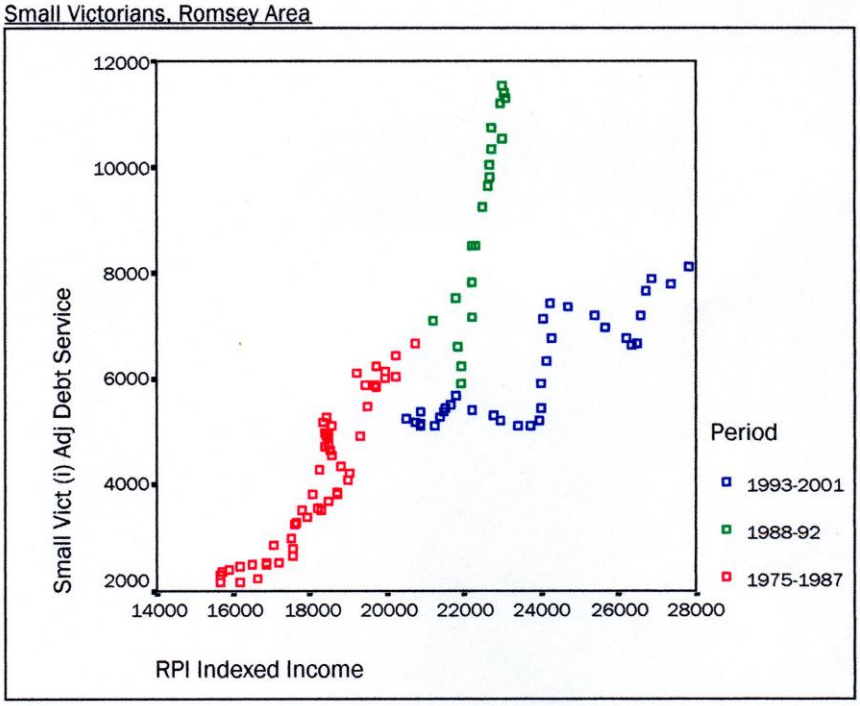
House Debt Service Relative to Average Income Levels for Various House Types, 1975 -2001

Mortgage interest rates smoothed over 6 quarters, 1 in advance and 5 in arrears.

RPI indexed to year 2000. Debt service for 100% debt.

Adjusted for ongoing changes in mortgage interest tax relief.

Small Victorians, Romsey Area



Small Victorians, Cowper Road

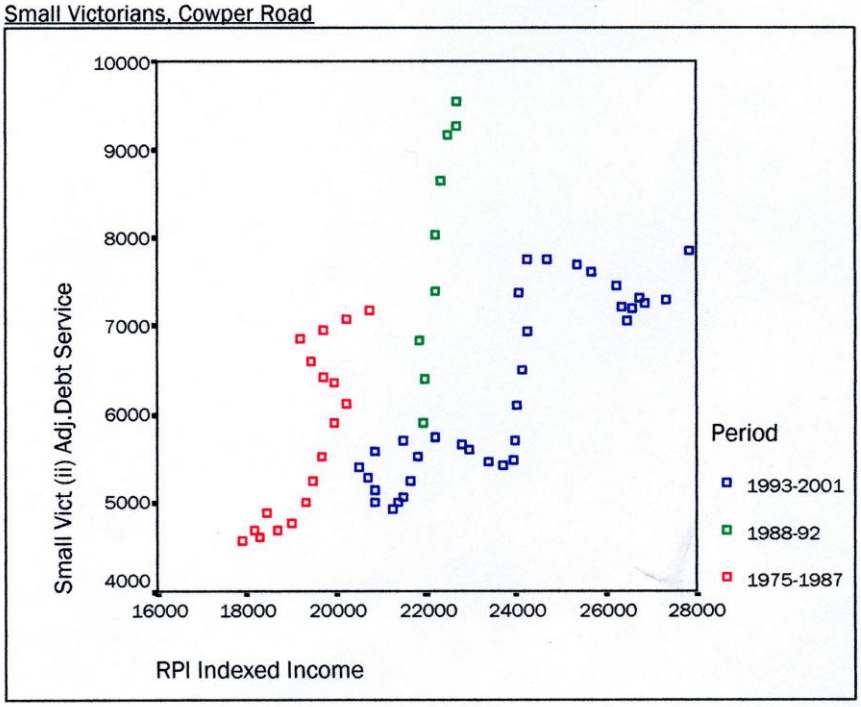
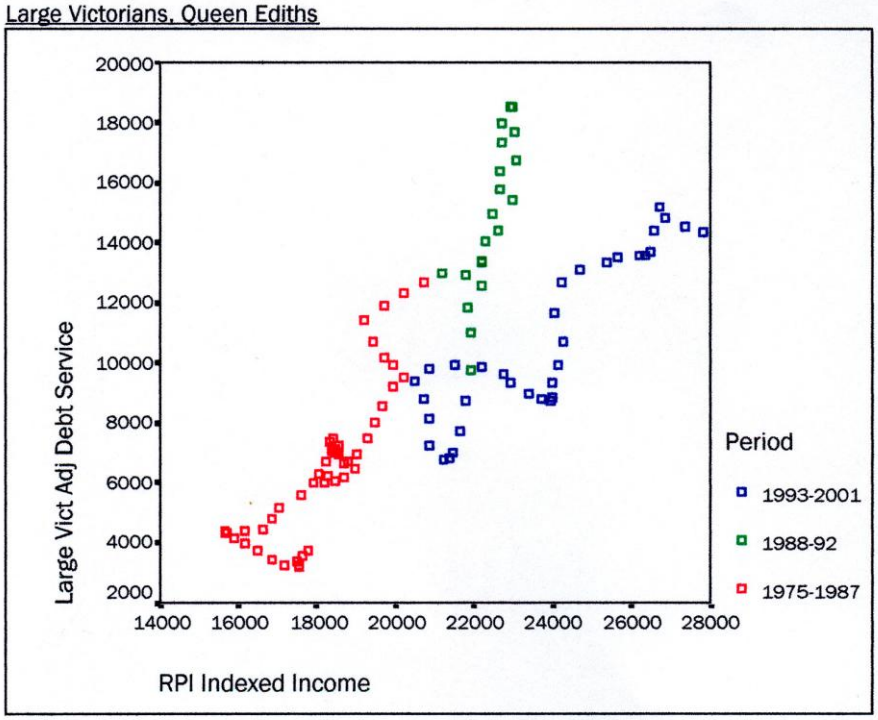


Exhibit 6.10: (continued)

Large Victorians, Queen Ediths



Interwar Builder: Perne and Cherry Hinton Area

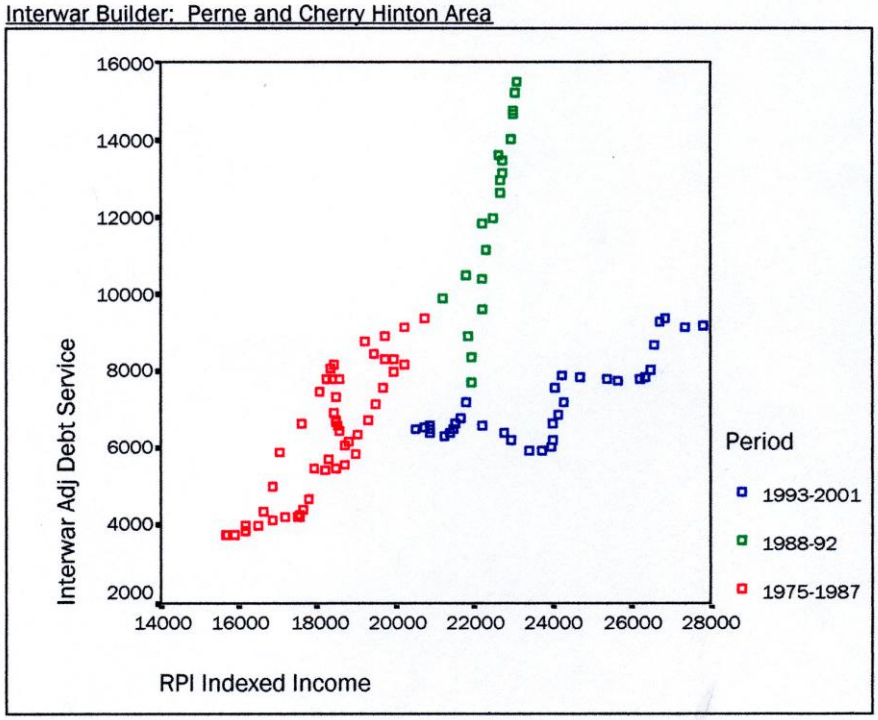


Exhibit 6.10: (continued)

Postwar (50-70s): Derwent Close and Cherry Hinton Area

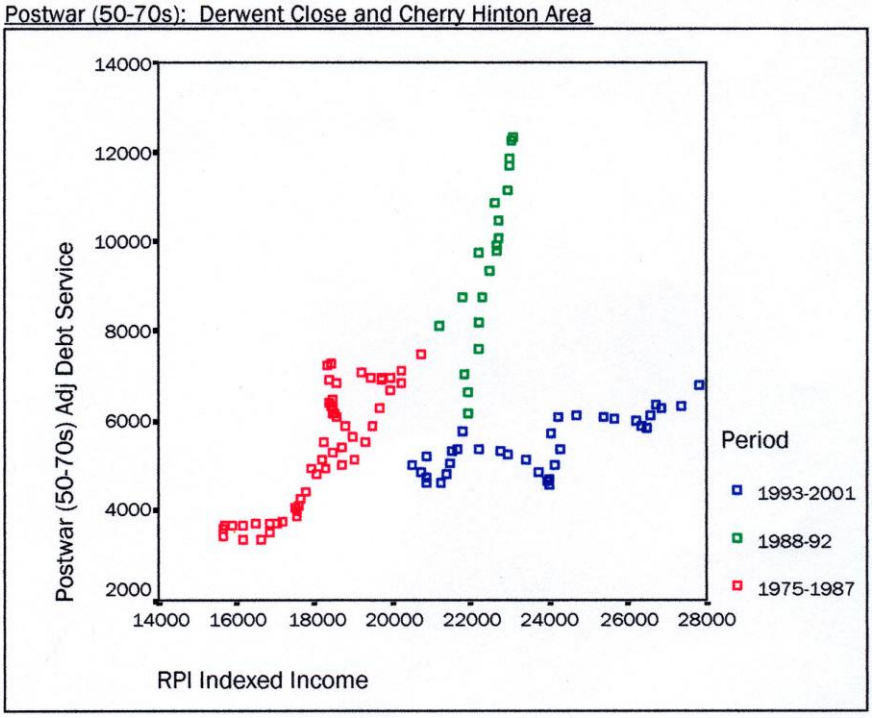


Exhibit 6.11: Regression results: Prices of different house types and mean income

CHANGES IN EXPENDITURES FOR DIFFERENT HOUSE TYPES RELATIVE TO AVERAGE INCOME
Regression Results
Dependent Variable: Miras and RPI adjusted Housing Expenditures on specific house types
Independent Variable: RPI adjusted average income for the East of England

		P E R I O D			
		2		4	
		Pre-Bubble		Post-Bubble	
		1975-87		1993-2001	
Small	Slope(B), 95%ci	1.0125	(.895-1.130)	0.4075	(.324-.491)
Victorian	Beta Standardized	0.9257		0.8685	
(Romsey)	Intercept/Std Error	-14,242.11	1,066.95	-3,452.66	979.21
	Adjusted R(sq)	0.8540		0.7466	
	ANOVA : F, sig	299.2902	0.0000	98.2385	0.0000
	Std Error of the Estimate	530.0382		526.3864	
	Slope 't', sig.	-13.3484	0.0000	9.9115	0.0000
	N= (data points)	52		34	
Small	Slope(B), 95%ci	1.0394	(.641-1.437)	0.4055	(.321-.490)
Victorian	Beta Standardized	0.8105		0.8649	
(Cowper Rd)	Intercept/Std Error	-14,288.72	3,634.19	-3,281.67	991.03
	Adjusted R(sq)	0.6570		0.7401	
	ANOVA : F, sig	30.6456	0.0000	94.9747	0.0000
	Std Error of the Estimate	605.7584		532.7383	
	Slope 't', sig.	-3.9318	0.0012	9.7455	0.0000
	N= (data points)	18		34	
Intewar	Slope(B), 95%ci	1.1707	(.974-1.368)	0.3954	(.300-.490)
Builder	Beta Standardized	0.8605		0.8318	
(Perne Rd)	Intercept/Std Error	-15,006.83	1,787.35	-2,135.17	1,110.88
	Adjusted R(sq)	0.7352		0.6823	
	ANOVA : F, sig	142.6004	0.0000	71.8829	0.0000
	Std Error of the Estimate	887.9147		597.1658	
	Slope 't', sig.	11.9415	0.0000	8.4784	0.0000
	N= (data points)	52		34	
Postwar	Slope(B), 95%ci	0.9379	(.786-1.0896)	0.2274	(.159-.295)
(1950-70s)	Beta Standardized	0.9379		0.7699	
Ch.Hinton Rd	Intercept/Std Error	-11,676.79	1,376.75	101.69	793.58
& Perne	Adjusted R(sq)	0.7503		0.5800	
Area	ANOVA : F, sig	154.2594	0.0000	46.5758	0.0000
	Std Error of the Estimate	683.9406		426.5947	
	Slope 't', sig.	12.4201	0.0000	6.8246	0.0000
	N= (data points)	52		34	
Large	Slope(B), 95%ci	1.6917	(1.386-1.997)	1.0646	(.857-1.272)
Victorians	Beta Standardized	0.8439		0.8795	
(Qu. Ediths)	Intercept/Std Error	-24,078.68	2,772.80	-14,474.56	2,425.04
	Adjusted R(sq)	0.7064		0.7665	
	ANOVA : F, sig	123.7161	0.0000	109.3447	0.0000
	Std Error of the Estimate	1,377.4647		1,303.6047	
	Slope 't', sig.	11.1228	0.0000	10.4568	0.0000
	N= (data points)	52		34	

(c) Summary Results of Regression Calculations

All results, in particular those from the 1975-87 period, relating house expenditures to income are high relative to the previously referenced studies. Among possible explanations may be that through the late 1970s and 1980s the older stock was upgraded, so the houses in 1987 are of a much higher standard than in 1975, and/or the shift in dominant tenure from rental to ownership had an impact. Ultimately, the 1975-87 expenditure/income relationship was unsustainable, as evidenced by the eventual collapse of house prices in the late 1980s which substantially lowered the slope of the expenditure/income regression lines.

Regardless of absolute levels, considering the different types of houses through the time periods clearly indicates relative price changes. In particular, the amount which consumers are willing to expend does depend upon the house form or 'vintage'. In the 1993 -2001 period the increases of the small Victorians relative to the Postwar houses have been most dramatic. In particular the following might be noted:

Large Victorians: The large Victorian and Edwardian houses, which are still somewhat modest by the standards of many other urban areas, have been the obvious 'winners' in south Cambridge. From third place in the early 1970s, below the interwar and 50-70s houses, they have increased in relative value, until through the 1990s their prices far exceed the other forms.

Interwar: There has been a continuous growth of the expenditures relative to Interwar Builder semis through the time period, although it has apparently been lower after the early 1980s, as their prices have slipped behind wider market increases.

Postwar (1950s-1970s): The growth in prices has been low and has declined through the period relative to the overall market. In the 1975-1987 period, when the average house prices in East Anglia rose by 1 per cent, a small Victorian (Cowper Road), rose the same amount, but a Postwar (50-70s) house rose by .97 per cent. In the 1993-2001 period, while both types increased at greater rates than the index, the Postwar houses increased at only 87.4 per cent of the rate of the small Victorians.

6.5 DISCUSSION

It is apparent that expenditure growth (and hence prices) for the different house types have moved at different rates during the period considered. This is in keeping with the results of the Attitudes and Preferences experiment which indicated that the marketplace evaluates different forms of houses differently, and that evaluations change over time.

It should be recognised that over the period of almost thirty years, some of the house types, in particular the small Victorians, undergo considerable physical transformation. The property advertisements of the early 1970s remark on the presence of central heating, and indoor plumbing, features now taken for granted and only mentioned when absent. Many of the newer advertisements for small Victorian terraces acknowledge loft conversions, building extensions, and some very substantial, and radical, reconstructions - which rarely affect the facade. This confirms the esteem in which these houses are now held: consumers apparently believe they are worth upgrading. While many current advertisements for 1950-70s houses note new windows, kitchens, and bathrooms, their prices remain relatively low. This suggests two related processes are at work relative to improvements. The first is that the Victorian houses are being maintained and improved because they enjoy a higher level of esteem among the primary consuming groups, and the bidding up of prices, in part, reflects the increase in quality of the houses.

The Interwar houses, after undergoing a relative decline through the 1970s and 1980s, have remained relatively stable since (Exhibit 6.5). The most recent data (1997-2001) suggests that the prices of the Interwar stock, relative to the overall market, are increasing, although it is possible that this reflects the shortage of supply, and their larger sites (relative to nearby Victorians) which allow expansion. Consideration of both respondents interviewed and data from more prestigious parts of Cambridge with Interwar houses, suggests that this change may be more advanced in other areas. It is possible that there may be a time-lag between a rise in esteem and the point at which the market prices are influenced by enough people willing to pay more for specific houses. The extent to which this is underway, and when, and to what extent it will affect South Cambridge will need to be reviewed in the future.

Part of the increase of the relative prices of the large Victorian houses is undoubtedly attributable to an increased number of relatively affluent individuals who, within an environment of constrained new supply, are bidding up the prices of the larger houses, so the divergence in relative prices between the large and small Victorians is to be expected. Seward et al (1992) suggested that higher priced houses appreciate faster than lower priced houses during periods of economic expansion, but not during contraction. This is consistent with the increase in prices of the larger Victorian houses during the 1990s, a period of more-or-less continual expansion of the Cambridge economy. In the Attitudes and Preferences surveys, Victorian houses were highly esteemed by the managers and professionals aged 35-59, exactly the group which would have benefited most from Cambridge's high-tech based economic expansion. The fact that the Postwar (50-70s) houses, with their larger land areas and garages, fell substantially in relative price, supports the role of differences in preferences. The Attitudes and Preferences survey showed that Postwar houses rank low in esteem among the same group.

Changing house evaluations by new cohorts of consumers may have decreased the desirability of the Postwar stock, because they were widely seen to have little socio-aesthetic worth. This did not matter when most consumers were primarily seeking functionality, but this now depresses their prices. Such price behaviour is consistent with the familiar concept that income elasticities are lower for staple commodities than for luxuries. Samuelson and Nordhaus (1992, p.91) noted that food staples, such as flour, margarine, and eggs, have a lower income elasticity than restaurant meals. The house price data suggests that, at least in part, the increase in price results from rising income: people choose to purchase more of the 'socio-aesthetic product' relative to the 'functional product', and houses offering more 'socio-aesthetic' benefits rise in price relative to more strictly practical elements in the marketplace.

The prices of small Victorian houses moved up through the late 1980s, and passed the Postwar stock. The significance of this move can be underlined by noting that in comparison with the Postwar houses, the small Victorians tend to have two bedrooms instead of three, and have on-street parking, while the Postwar houses have garages. In most objective measures the Postwar houses are markedly superior to the Victorian terraces, but have still fallen behind them in what consumers are willing to pay.

Various house types are close substitutes; consumers may decide that a Victorian house is too expensive, and purchase a relatively cheaper Postwar house in the next street, so the marketplace may only tolerate certain levels of price differentials between house types. Moreover, unlike restaurant meals and home-cooked meals, absolute differences in socio-aesthetic esteem assigned to different houses are only constructs in the minds of the consumers. This means that they may not be permanent - 'Building' of 1848 thought that any generation which liked Victorian design features would have to be 'degenerate'. The recent appearance of Interwar Reproductions and newspaper articles on them, suggests that the Interwar stock, which apparently fell in esteem through the late 1970s, has recently started to rise. One might expect such a trend to eventually occur relative to the Postwar stock.

6.6 CONCLUSIONS

The results support the hypothesis that consumer effects do have an impact on the overall esteem accorded to different types of housing, that such levels of esteem do change over time, and that they are reflected in expenditures on housing. This study supports Goodman and Thibodeau's (1995) hypothesis that housing models are incomplete without some reflection of housing 'vintages'. The aggregation of data may give inappropriate results because the willingness of consumers to pay for houses of different vintages can change, making a study over time incomplete without variables for both house 'vintage' and temporal change: consumer 'vintage' preferences in the 1970s were different than in the 1990s.

The findings of this house price study shows that changes in the relative expenditures on different house forms in south Cambridge concur with the surveyed consumer attitudes. While the primary house consuming populations of the 1990s regarded the Postwar housing stock as offering excellent, functional shelter, such houses do not satisfy the more complex expectations of the primary consuming elements of the population. Therefore, the prices of Postwar houses have fallen behind houses which, to the current marketplace, offer to fulfil the more complex non-material expectations. This is consistent with the interpretations of modern consumption offered by Jackson and Marks (1999) and Ropke (1999) that, in developed countries, recent increases in consumption have been modest among products seen to fulfil 'material' or 'absolute' needs, but have been much greater for those filling 'non-material' or 'relative' needs. Thomas (1986, p.1) expressed it differently: "The benchmark of acceptability has shifted to reflect higher aspirations."

Exhibit 6.12: Map showing areas in which house price data was collected

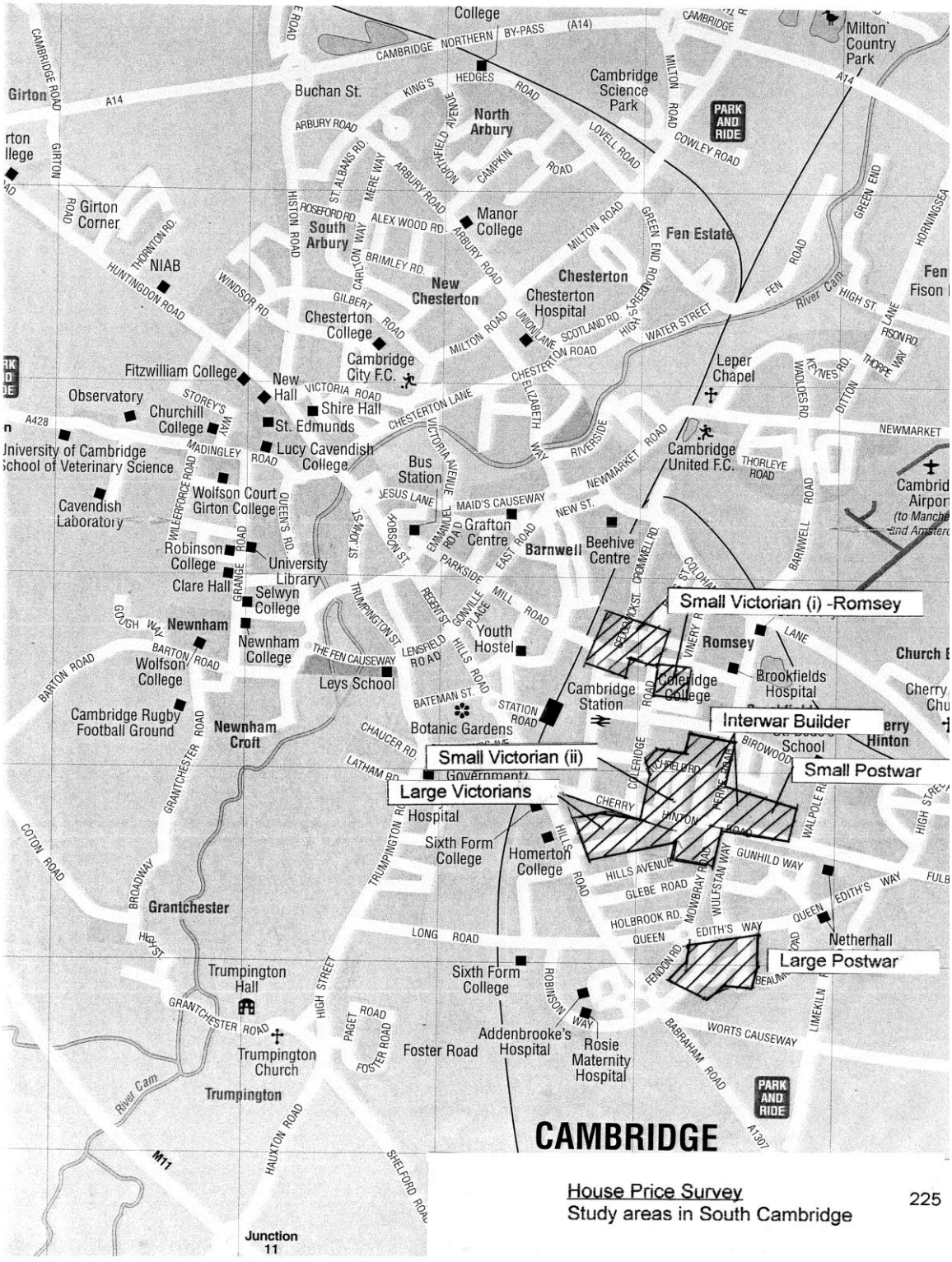


Exhibit 6.13: Photographs and advertisements for house types in study area (late 2001)

Hartington Grove **£295,000**

A fine three bedroom south city town house improved and modernised with hall, cloakroom, sitting room opening to dining room, breakfast room, kitchen, 1st floor bathroom, gas radiator central heating and enclosed rear garden.

Blinco Grove **£269,950**

An outstanding south city Victorian townhouse tastefully improved and modernised, retaining many period features, hall, sitting room with opening into dining room, re-fitted kitchen and ground floor bathroom, three double bedrooms, gas radiator central heating, delightful 100ft plus rear garden.

Perne Avenue **£195,000**

A quite splendid three bedroom semi detached house in highly regarded city location off Perne Road benefiting from double glazing, gas central heating, entrance hall with understairs cloakroom, lounge/diner, conservatory, kitchen, three bedrooms, first floor bathroom, single garage, block paving to the front and side, rear garden with patio area. Internal inspection recommended.

Thoday Street **£149,500**

Victorian mid terrace house benefiting from gas fired central heating, enclosed rear garden and some original features including fireplaces and panel doors. The house comprises entrance hall, lounge 3.60 m x 3.14 m (11'10" x 10'4"), dining room 3.45 m x 3.37 m max (11'4" x 11'1" max), kitchen 2.92 m x 2.92 m (9'2" x 9'2"), bathroom, first floor landing, 3 bedrooms, rear garden. The property is in need of some upgrading and is offered with no upward chain.

Perne Avenue
Guide price £160,000

A well presented and extended 1930's family home in this ever popular location.

Entrance hall, 2 reception rooms, kitchen, 3 bedrooms, 1st floor bathroom, delightful well stocked gardens, large shed.

Blinco Grove
Guide price £295,000

Improved semi detached turn of the century home with generous accommodation arranged on three floors in this sought after location.

Perne Road **£165,000**

Extended semi-detached home. Hall, cloakroom, lounge with doors to garden, kitchen/breakfast room, utility, sitting room, 3 bedrooms, bathroom, parking, garage, front and rear gardens, workshop/studio. Gas heating, double glazing.

Suez Road **£159,995**

A Victorian mid terrace house benefiting from gas fired central heating and comprises sitting room, separate dining room, fitted kitchen, first floor landing, three bedrooms, first floor bathroom, enclosed rear garden with rear pedestrian access. The house is currently subject to an assured short hold tenancy, which will expire end of November 2001.

Derwent Close **£127,000**

Must be seen internally, superbly improved by the present owner with hall, sitting room, dining room, kitchen, timber garden room, three bedrooms, bathroom, uPVC windows, gas central heating, fully enclosed garden, garage.

7.0 RENOVATION SURVEY

In a way similar to price results, consumer response should also be manifested in the way the housing stock is maintained and improved. That a first housing response may now be to improve one's existing dwelling, as proposed by Tse and Raftery (1999), is in distinct contrast to what would have been previous practice in a stock which was largely rented. Renting made moving in response to increased (or decreased) affluence or changed needs easier, and improvement of houses less likely.

7.1 Background and Objectives

The graph of repair and maintenance per housing unit, Exhibit 7.1 shows a doubling in real terms between 1964 and 1995. While part of this may reflect the increasing age of the stock, it also suggests an increasing societal willingness to expend the resources to keep existing dwellings in good condition. If this is the case, it is of interest to understand:

- the motives for improvement of houses;
- which elements of the housing stock are subject to the most intensive renovation activities;
- the characteristics of the elements of the population which are causing the work to be undertaken.

It should be expected that there is some relationship between the work being done, the houses involved, the people undertaking it, and the structure of the attitudes and preferences noted in the main survey.

Exhibit 7.1 Repair and maintenance expenditures per housing unit, 1965-1995, Great Britain
Source: DETR Housing and Construction Statistics

This survey was, in the interests of efficiency, distributed in conjunction with work being undertaken by the author in conjunction with a 'Partners in Innovation' (PII) project funded by the Department of the Environment, Transport and the Regions. As such, the other parts of the survey related to sustainability in housing refurbishment. The questions of interest herein related to the profile and motivations of consumers renovating houses in Cambridge, and which dwelling types are most subject to renovation activity. While the PII project elements gave an emphasis to 'what was being done', the questions for the purpose of this thesis focussed on the issue of 'who was doing the work, and why'.

7.2 RESEARCH DESIGN AND PROCESS

7.2.1. Survey Design

(a) Questionnaire

A survey document was created which fit on two sides of an A4 page. This is included as Exhibit 7.15. It was identified as coming from the Martin Centre for Architectural and Urban Studies in association with Cambridge Architectural Research Ltd., the PII prime partner.

The first page asked for information about the house being refurbished, and about the respondent household. The second page asked for details about the work being undertaken, and a ranking of reasons of why the work was being undertaken. A Freepost envelope was included for the return.

(b) Distribution

The names and addresses of applicants for planning permission are readily obtained in planning departments. In Cambridge, the information also includes a brief description of the work proposed. Accordingly, it was possible to identify those people who were proposing to undertake substantial work to their dwellings, and mail them a survey. This does not identify more minor work which would not require planning permission, although some applications were for items which possibly might have been included under The General Development Order (Telling and Duxbury, 1993, p.119-120).

For random weeks between October 1998 and September 2000, all the applicants for planning permissions were considered. Applications involving house renovations were chosen which conformed to the following requirements:

(a) The applicant and the address of the property were the same. This should have had the effect of reducing the number of surveys sent to dwellings being refurbished or extended for rental or investment purposes. Similarly, if the work apparently related to investment activities, such as creating a second unit, it was not included.

(b) Although the work being done by the subjects is, by definition, consequential enough to require planning permission, applications which were only for conservatories or garages were not included.

The surveys were sent, in three waves. The first wave consisted of a distribution of nine surveys which were hand delivered to houses being renovated in south Cambridge. This was used to test the survey form. The second and third waves consisted of mailings to 173 addresses.

Based on a review of responses to the second wave, three changes were made to the survey form for the third wave.

(i) The introduction was rewritten in response to comments from a member of the Martin Centre who had received one, and thought that it could be 'friendlier';

(ii) A question was changed relating to energy efficient boilers, as a suspiciously high number of respondents indicated that they had, or were installing one. This question did not relate to the purposes of this thesis.

7.3 LEVEL OF RESPONSE

A total of 173 surveys were distributed, and 75 were returned, representing a response rate of 43.35 per cent. Initial analysis of the results indicated that only certain parts of the population were undertaking substantial renovations. To confirm that this was not a result of a self-selecting return process, whereby certain groups were renovating but not returning the survey, 14 non-respondents were telephoned. Of these, four could not be contacted as the telephone numbers were no longer in service, however the telephone interview results indicated that there was no apparent difference between the characteristics of the responding sample and the total population of refurbishers. The telephone responses were not included in the analysis.

7.4 ANALYSIS

The responses were coded and assembled into a data file for analysis with SPSS. This analysis considers aspects which relate to consumer influences on housing life-processes.

7.4.1. Characteristics of Those Undertaking Refurbishment

(a) Age

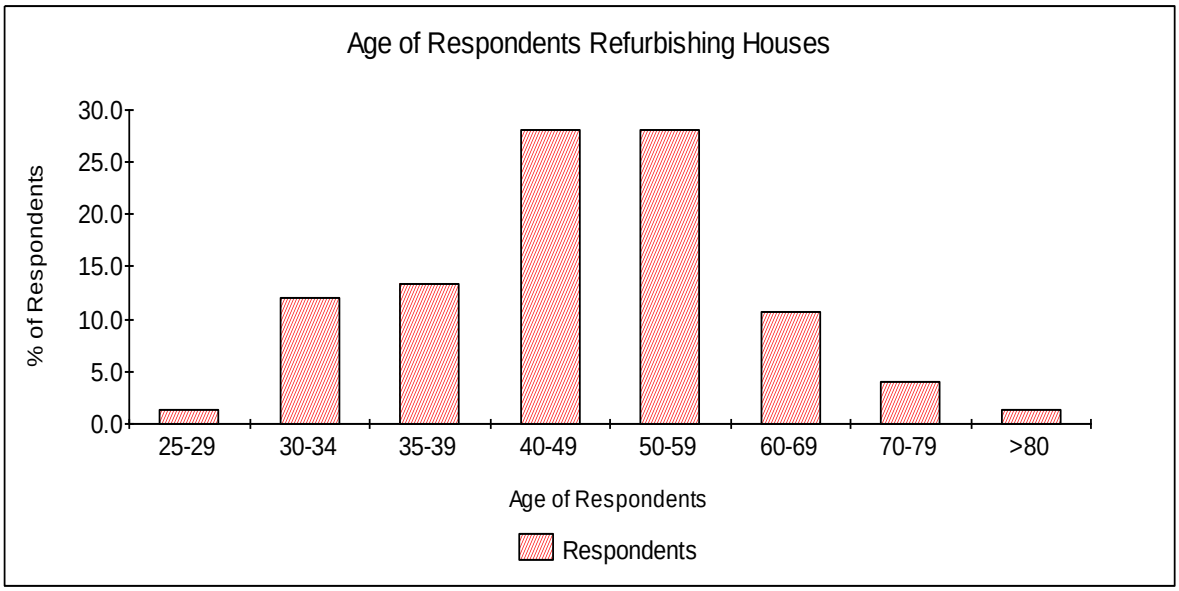
In general, few respondents were in the household formation stage. As Exhibits 7.2 and 7.3 indicate, almost half (44.7 per cent) of the respondents indicated an age of over 50. Only 27.0 per

cent of the respondents were under age forty, and 13.5 per cent under age 35.

Exhibit 7.2: Age of respondent homeowners applying for planning permission (Table)

	Age	Frequency	Percent	Valid Percer	Cumulative % Valid
	25-29	1	1.3	1.4	1.4
	30-34	9	12.0	12.2	13.5
	35-39	10	13.3	13.5	27.0
	40-49	21	28.0	28.4	55.4
	50-59	21	28.0	28.4	83.8
	60-69	8	10.7	10.8	94.6
	70-79	3	4.0	4.1	98.6
	>80	1	1.3	1.4	100.0
Total		74	98.7	100.0	
Missing		1	1.3		
Total		75	100.0		

Exhibit 7.3: Age of respondent homeowners applying for planning permission (Graph)



(b) Household Size

While increasing the amount of space available in the dwelling was often indicated as a major motivation for undertaking the work, over half (50.7 per cent) of the respondents indicated that they had no young children (Exhibit 7.4). Only 12.1 per cent indicated they had more than two children. Clearly, a typical renovator does not have a large family. The mean family size, counting adults and children under age 18, was 3.083.

Exhibit 7.4: Number of children under age 18 in respondent households

Number	Frequency	Percent	Valid %	Cumulative %
0	38	50.7	51.4	51.4
1	10	13.3	13.5	64.9
2	17	22.7	23.0	87.8
3	5	6.7	6.8	94.6
4	3	4.0	4.1	98.6
5	1	1.3	1.4	100.0
Total	74	98.7	100.0	
Missing	1	1.3		
Total	75	100.0		

(c) Occupation

Almost two-thirds of those responding, (65.6 per cent including building professionals) indicated a higher level managerial or professional occupation (Exhibit 7.5). Almost a quarter (23.4 per cent) work in the building industry, of whom the majority were in trades, including carpenters, roofers, electricians and plasterers. Only three respondents (4.7 per cent) indicated a non-construction manual trade. Of interest is one of the two people who in the telephone process indicated a non-building manual occupation. This person also said that he had renovated a number of houses before - apparently regarding this process as a business. It is not known whether any of the three non-building manual trade responses in the survey also regard house renovation as an ongoing income-generating activity.

Exhibit 7.6 Respondent occupation

	Frequency	Percent	Valid %	Cumulative %
Building Trade	10	13.3	15.6	15.6
Manual Trade (non-building)	3	4.0	4.7	20.3
Professional/Managerial	37	49.3	57.8	78.1
Lower Mgt/Office	9	12.0	14.1	92.2
Building Professional	5	6.7	7.8	100.0
Total	64	85.3	100.0	
Missing	11	14.7		
Total	75	100.0		

(d) Nationality

Cambridge, because of its nature as a university / high-tech centre, has a high proportion of people from various parts of the world. Of the people indicating country of origin, 13.4 per cent indicated they came from either a European country, the U.S.A., or the 'Old Commonwealth' (Australia, Canada, New Zealand). There were no responses indicating any other nationalities. However, 10.7 per cent of those returning the forms, did not indicate their country of origin (Exhibit 7.6).

Exhibit 7.6: Nationality of respondent

	Frequency	Percent	Valid Percent	Cumulative Percent
U.K.	58	77.3	86.6	86.6
Old Commonwealth	2	2.7	3.0	89.6
W.Europe	4	5.3	6.0	95.5
USA	2	2.7	3.0	98.5
Other Europe	1	1.3	1.5	100.0
Total	67	89.3	100.0	
Missing	8	10.7		
Total	75	100.0		

(e) Duration of Residency

While the mean duration of residency in the dwelling being renovated was 10.5 years, the median was 6.5 years (Exhibit 7.7). Although some very long periods of occupation were indicated, approximately 38 per cent had moved into their houses less than five years previously. Nevertheless, more detailed consideration of the data in the 0-4 category indicated also that only five individuals had lived in their house for less than two years.

Exhibit 7.7: Duration of residency

	Frequency	Percent	Valid %	Cumulative %
0-4 yrs	28	37.3	37.8	37.8
5-9 yrs	16	21.3	21.6	59.5
10-14 yrs	10	13.3	13.5	73.0
15-19 yrs	8	10.7	10.8	83.8
20-24 yrs	1	1.3	1.4	85.1
25-29 yrs	2	2.7	2.7	87.8
30-34 yrs	5	6.7	6.8	94.6
35-39 yrs	2	2.7	2.7	97.3
40-45 yrs	2	2.7	2.7	100.0
Total	74	98.7	100.0	
Missing	1	1.3		
Total	75	100.0		

Most of the work is being undertaken by people who believe they will live in their current dwellings for some time to come; only 11.1 per cent expected to live in their house for less than five years (Exhibit 7.8).

Exhibit 7.8: Time expected to remain in house

	Frequency	Percent	Valid %	Cumulative %
Unsure	16	21.3	22.2	22.2
< 5 yrs	8	10.7	11.1	33.3
> 5 yrs	16	21.3	22.2	55.6
> 10 yrs	20	26.7	27.8	83.3
> 20 yrs	12	16.0	16.7	100.0
Total	72	96.0	100.0	
Missing	3	4.0		
Total	75	100.0		

While it might be believed that those in the building industry, especially if they might regard repeated house renovation as an income-generating activity, would have lived in the house for a lesser period of time than the balance of the renovators, and expect to remain for a shorter period of time, the data does not support such a hypothesis. However, through the telephone contacts made with non-respondents, two people in the building industry did indicate that they were repeat refurbishers. It is possible that because repeat refurbishment could be interpreted as an ongoing business with tax consequences, people engaged in it are unwilling to so indicate in a written response. Alternatively, refurbishment of houses undertaken by building tradespeople, while they live in the houses, is a long-term proposition, with work being done only when they had no outside work to undertake. Discussions with two builders doing so (and their wives) suggested that this is the case.

7.4.2. Characteristics of Houses Being Refurbished

The advancing age of the post-war stock is indicated by the fact that 33 of the 72 houses (45.8%) for which planning permission was applied, were built between 1950 and 1980; only 12 (16.7 per cent) were Victorian (Exhibit 7.9). This unexpected finding, may reflect that the City's large stock of Victorian houses has already been refurbished and extended, and that Postwar houses now need reworking to meet current expectations. Visits to houses of the 1950-60 period offered for sale, indicated that many remain in their original form, and require at least new kitchens and bathrooms. It may also, in part, reflect that many houses built in the 1950s to 1970s were built on large parcels of land, factors which allow more aggressive improvement than the narrow, if deep, properties which are typical of Cambridge's Victorian stock, which is suggested by the relatively few terraced houses in the responses (Exhibit 7.10). Of course, more modest work, such as simply renovating kitchens and bathrooms, does not require planning permission so would not be detected in this survey.

Exhibit 7.9: Era in which subject house was built

	Frequency	Percent	Valid %	Cumulative %
Pre-Victorian	2	2.7	2.8	2.8
Vict/Edwardian	12	16.0	16.7	19.4
Interwar	22	29.3	30.6	50.0
1950-79	33	44.0	45.8	95.8
1980-2000	3	4.0	4.2	100.0
Total	72	96.0	100.0	
Missing	3	4.0		
Total	75	100.0		

Exhibit 7.10: Form of house for which planning application was made

	Frequency	Percent	Valid %	Cumulative %
Detached	28	37.3	37.8	37.8
Semi-Detached	32	42.7	43.2	81.1
Terrace	11	14.7	14.9	95.9
Other	3	4.0	4.1	100.0
Total	74	98.7	100.0	
Missing	1	1.3		
Total	75	100.0		

Thirteen houses (17.3%) were council built. Many of the Interwar Council-built houses, particularly in south Cambridge, have substantial land areas, so are quite amenable to substantial enlargement.

7.4.3 Reasons Why People Are Undertaking Refurbishment

The survey asked for reasons why the various items of work were being undertaken. Overwhelmingly, people suggested 'more space' and 'quality of life', with 'repair' and 'increase property value' following as far distant third and forth rankings (Exhibit 7.11).

Exhibit 7.11: Reasons for undertaking work

	Frequency	Percent
More Space	54	26.2%
Needed Repair	20	9.7%
Money Available	12	5.8%
Increase Property Value	17	8.3%
Comfort/Energy	9	4.4%
Exernal Appearance	13	6.3%
Quality of Life	50	24.3%
In-House Office	16	7.8%
Nothing Suitable in Market	12	5.8%
Other	3	1.5%
	206	

The survey asked for a ranking of the three main reasons the work was undertaken (Exhibit 7.12). While many of the respondents simply checked three reasons without indicating ranking, the overwhelming selection of 'to provide more space' and 'improvement to quality of life' indicates that most of the refurbishers are fulfilling more than utilitarian needs, especially when one considers the small size of the households which are undertaking renovation.

Exhibit 7.12: Reasons for undertaking work: Number of times ranked first

	Frequency	Percent of All Reasons
More Space	24	11.7%
Needed Repair	0	0.0%
Money Available	0	0.0%
Increase Property Value	1	0.5%
Comfort/Energy	2	1.0%
Exernal Appearance	1	0.5%
Quality of Life	16	7.8%
In-House Office	2	1.0%
Nothing Suitable in Market	2	1.0%
Other	2	1.0%
	50	

It is also possible to compare the number of children with the reasons (Exhibit 7.13). While, of the nine households with three or more children, all but one indicated 'more space' as a reason for the work, an inverse relationship may be noted for other variables such as 'quality of life', 'increase property value', and 'money available'. Some caution must be observed with these statistics as for some groups sample size is quite limited.

Exhibit 7.13: Reasons for undertaking work and number of children in household

Number of Children	0	1	2	3	4	5
Number in Sample	38	10	17	5	3	1
Choosing 'more space'	23	8	15	5	2	1
Expected count	27.0	6.9	13.1	3.9	2.3	0.8
% Choosing 'more space'	60.53%	80.00%	88.24%	100.00%	66.67%	100.00%
Choosing 'quality of life'	26	5	13	4	2	0
Expected count	25.0	6.4	12.1	3.6	2.1	0.7
% Choosing 'quality of life'	68.42%	13.16%	34.21%	10.53%	5.26%	0.00%
Choosing 'increase property value	12	2	2	1	0	0
Expected count	8.5	2.2	4.1	4.2	0.7	0.2
% Choosing 'property value'	31.58%	5.26%	5.26%	2.63%	0.00%	0.00%
Choosing 'money available'	6	1	5	0	0	0
Expected count	6.0	1.5	2.9	0.9	0.5	0.2
% Choosing 'money available'	15.79%	2.63%	13.16%	0.00%	0.00%	0.00%

The mean expected time to remain in the building is 9.7 years. While the building trades, on average, indicated that they plan to remain for an extended period, a number also indicated a short expected residency (Exhibit 7.14): it becomes clear that some of the building trades are either using the houses to increase their equity so using them as 'stepping stones' to larger dwellings, or they are refurbishing houses as a secondary occupation. The building professionals did not show the same characteristics. On the average the responding building industry professionals lived in a house the longest of any group before undertaking their major renovation. If the 'uncertain' responses are taken as indicating an unknown, but lengthy expected future occupation of the house, the building professionals also expect to live in the house for a considerable period.

Exhibit 7.14: Occupation and duration of residency

Occupation		Years Duration of Residence	Expect to Remain
Building Trade	Mean	5.5	8.83
	N	10	6
	Std. Deviation	8.64	6.48
	No.Uncertain		4
Manual Trade (non-building)	Mean	10.0	6.5
	N	3	2
	Std. Deviation	17.32	4.95
	No.Uncertain		1
Professional / Managerial	Mean	7.3	10.75
	N	37	32
	Std. Deviation	8.63	6.67
	No.Uncertain		5
Lower Mgt/Office	Mean	9.44	7.29
	N	9	7
	Std. Deviation	13.1	6.19
	No.Uncertain		2
Building Professional	Mean	15.0	4.95
	N	5	2
	Std. Deviation	13.69	4.34
	No.Uncertain		3
Total	Mean	8.05	9.67
	N	64	49
	Std. Deviation	10.1	5.93
	No.Uncertain		15

7.5 DISCUSSION AND CONCLUSIONS

This survey supported the results of the other investigations. Clearly, substantial renovation work in the Cambridge housing stock tends to be undertaken by more mature households, with professional or managerial ('high achiever' or 'service') occupations, and with few or no children living at home. These elements are a growing part of the overall population, as discussed in the *Projections of Households in England to 2021*. In the Attitude and Preference survey (Chapter 4), they indicated that they evaluated houses higher on socio-aesthetic bases than did their 'working' predecessors, and are at a stage of their lives when they have discretionary financial capacity. That they esteem houses more than as just utilitarian structures, means that they have a propensity to invest in improvements relative to other discretionary expenditures, although the incidence of foreign travel shown in the Attitudes and Preferences surveys suggests they can refurbish and travel too. Reschovsky (1992, p.66) in his investigations of homeowners in Houston, Texas, found that the propensity of undertaking what he called 'discretionary upkeep' (improvements and extensions), such as might in the U.K. demand planning permission, was positively linked with income, although 'non-discretionary upkeep', meaning essentially routine maintenance, was not.

Members of the building industry make up a large sub-set of those renovating houses. It is reasonable to regard much of this activity in the nature of a business, or that building trades find the work less daunting and have contacts with whom they do business, thereby reducing the difficulty, risk, and cost of undertaking improvements. However, this applies to the building trades, not the building professionals.

The figures regarding children generally tend to refute any arguments which might be made that increased numbers of small households means that smaller houses can meet future demand, of interest in light of the *Projections of Households in England to 2021* which indicates decreasing household size. The survey results imply the converse - that smaller households will increasingly demand larger houses, presumably because they have more discretion in their spending patterns. The logic behind this might be that children are increasingly expensive - especially among the groups of the population which value independent education. Accordingly, households with younger children direct their resources into them until they leave home; only then are funds allocated to extend houses to fulfil 'lifestyle' demands. This is amplified by the recognition that only three households indicated a non-building manual trade - it appears that as the population becomes more oriented away from manual trades, it will become increasingly focussed on the size and quality of their houses.

In the Attitudes and Preferences survey it was seen that the housing stock dating from the 1950s to 1970s is not highly esteemed by the major consuming groups. This apparently does not stop consumers from improving it, so suggests that a lack of esteem will not cause this portion of the stock to deteriorate to the extent that demolition becomes commonplace. Of course, in some cases, the size and value of the underlying land may put these dwellings at risk of demolition, regardless of their state of repair, to allow the construction of larger houses.

Relative to consumer influences on housing life-processes, it appears that, within the City of Cambridge, major improvements of houses are willingly undertaken by people with discretionary income, for 'life-style' reasons, in preference to other forms of consumption. Traditional functionally-focussed theories about housing life-processes and obsolescence, do not support such a process, which might be seen as driven purely by consumer attitudes and the availability of money. That housing improvement is associated with (i) educated, professional and managerial groups, (ii) a greater regard for the less strictly utilitarian aspects of housing, and (iii) 'life-style' objectives seems to be apparent in the responses. As the socio-economic groups most likely to refurbish their houses increase as a percentage of the population, it suggests that certain portions of the housing stock will experience increasing investment. This demand to support 'quality of life' is similar to that which, in the house price survey, drives the prices of large Victorian houses upwards at a higher rate than the smaller houses in the same area. The propensity to refurbish houses from the 1950-1970 period suggests that this applies even to the dwellings which hold limited esteem in the marketplace. Unfortunately, a corollary to be considered is that less affluent neighbourhoods are not likely to experience the same level of ongoing major investment, and adaptation to changing needs, although this does not imply that they will not be well-maintained in their original form.

The Martin Centre for Architectural and Urban Studies, University of Cambridge
6 Chaucer Road, Cambridge, CB2 2EB
in association with Cambridge Architectural Research Ltd.

SURVEY OF HOUSING IMPROVEMENTS

This survey is intended for households who have recently planned to make improvements to their property. It should be completed by one of the people with the most input on deciding what to do. It is designed to explore the improvements people make to their homes and their reasons for making them. This is a confidential survey, so there is no need to include your name or address.

We have attached a FREEPOST envelope to make returning the survey easier for you.

Please tick all relevant boxes.

What stage have the improvements reached?

Completed ☐ Proceeding ☐ Deferred ☐ Abandoned ☐

If abandoned, why? Planning permission not granted ☐ Changed needs ☐
Costs came in too high ☐ Changed family circumstances ☐

Other (please give details):

A Yourself

1 Age:
under 20 ☐ 20-24 ☐ 25-29 ☐ 30-34 ☐ 35-39 ☐
40-49 ☐ 50-59 ☐ 60-69 ☐ 70-79 ☐ 80+ ☐

2 Nationality: _____

3 Occupation (or previous occupation if not currently employed):

B Your Household

4 How many people are currently permanently living in your house?

no. adults _____ no. children (under 18) _____

5 If you have children, please state how many are in each age group:
__ under 5 years old
__ 5 to 11 years old
__ 11 to 18 years old
__ 18 to 25 years old
__ over 25 years old

C Your Current Home

6 Street name: _____ Postcode: _____

7 Type of house: detached ☐ semi-detached ☐ terraced ☐ flat ☐
other _____

8 When built: pre-Victorian ☐ Victorian/ Edwardian ☐ interwar ☐ 1950-79 ☐
1980-2000 ☐ unsure ☐

9 Was your home council-built? ☐ yes ☐ no ☐ unsure

10 How long have you lived in the house you are improving? __ years

11 How much longer do you expect to remain at your current address?
Less than 5 years ☐ at least 5 years ☐ at least 10 years ☐ at least 20 years ☐ unsure ☐

12 How many bedrooms did you have before your alterations? _____ And bathrooms? _____

How many bedrooms do you now have / will you have? _____ And bathrooms? _____

CONTINUED ON OTHER SIDE

13 If you are enlarging your house (extension or loft conversion);

a) How much floor area have you gained? (approximately) _____ sq m

b) What level of insulation does your extension have?

high☐ average☐ low☐ none☐ don't know☐

14 How important are / were matters of energy-efficiency to you when planning your house improvements? Please circle the number corresponding to the appropriate level of importance.

Not at all 0 . . . 1 . . . 2 . . . 3 . . . 4 . . . 5 A major influence

15 What improvements did you make (or are in the process of making)? (tick all that apply)

a)	adding bathroom(s) ☐	b)	adding toilet(s) ☐
c)	upgrading existing bathroom(s) ☐	d)	increasing kitchen area ☐
e)	replacing kitchen units / surfaces ☐	f)	adding bedroom(s) ☐
g)	adding conservatory ☐	h)	adding garage ☐
i)	increasing living room area ☐	j)	adding an office / workspace ☐
k)	moving / removing interior walls ☐	l)	loft conversion ☐
m)	replacing / repairing roof ☐	n)	replacing exterior doors ☐
o)	replacing interior doors ☐	p)	replacing windows ☐
q)	adding double glazing ☐	r)	adding draughtproofing ☐
s)	decorating interior ☐	t)	replacing carpets / flooring ☐
u)	landscaping improvements ☐	v)	painting / rendering exterior ☐

w) improving insulation in existing structure . . . . ☐

x) replacing or installing boiler / heating system . . . ☐

y) other changes (please give details)

16 What were the main reasons you decided to under take the improvements?
Please choose the three most important factors below and rank them 1-3 (1=most important.)

a) to provide more space . . . . . _

b) necessary repair / maintenance work . . . . . _

c) money became available . . . . . _

d) to increase the property value . . . . . _

e) to improve thermal comfort / reduce heating costs . . _

f) to improve the house's external appearance . . . _

g) improvement to quality of life . . . . . _

h) to create an office / workspace at home . . . . _

i) nothing suitable/affordable in local housing maket . _

j) other (please give details):

17 Do you have an energy-efficient boiler, or are you planning to install one?

☐yes ☐no ☐unsure

18 a) Have you taken any professional advice about your your alterations?

☐yes ☐no

b) If you did, who advised you?

☐architect ☐builder ☐surveyor ☐builders' merchant

☐other _____

19 How important is / was it that the improvements are in keeping with the external character of the house?

high☐ middling☐ low☐ not at all☐

20 How important is / was it that the improvements are in keeping with the interior character of the house?

high☐ middling☐ low☐ not at all☐

21 Please feel free to add any other comments:

When complete, please return this form using the attached FREEPOST envelope.
Thank you for taking the time to complete this survey.

PART 3: DISCUSSION AND CONCLUSIONS

8.0. DISCUSSION

8.1. THE IMPORTANCE OF UNDERSTANDING THE LIFE-CYCLE OF HOUSING

8.1.1. Review of Objectives

Housing is an important part of the urban environment, and plays a major role in quality of life. It was shown through demolition statistics and analysis of the changing age composition of the stock, that there has been a change in the life-cycle of housing. This generates a hypothesis that the way consumers attribute value to different housing forms has changed. The research was focussed into gaining insights into the nature and processes involved in such change.

8.1.2. Research Review

A variety of sources were considered in developing an understanding of the forces which are manifested as housing life-cycles. One approach, which persists into the 1990's literature is that housing ages chronologically, ultimately being demolished and replaced. However, the dramatic reduction of demolition rates in the 1970s, and the increasing age of the housing stock, suggests that such is not universal. A variety of factors were explored as to why the housing life-cycle changed, and matters of how value is assigned to the less-tangible aspects of houses by consumers emerged as most important.

Until well after World War Two, housing which was 'old' had been built prior to the appearance of significant building and planning controls, so much was of dubious quality, even before it aged. Moreover, much of the 'old' stock was in private ownership, rented, and under rent controls. Given this structure, and indeed the widespread belief that housing was a time-limited asset, maintenance and improvement were discouraged. A researcher would have required extraordinary insight to have seen that housing life-processes could change, based on (i) rising affluence and widespread owner-occupation, (ii) fulfilment of the demand for fundamental shelter, together with (iii) the removal of the worst of the pre-1875 housing stock, and (iv) the assurance of urban stability through building and planning regulation.

Through the literature review it was evident that the simple old beliefs about housing life-cycles are untenable, so new research and theory is necessary to explain recent housing life-processes in the U.K. Existing research is inadequate, due to being conducted in other countries, dealing with other types of buildings, or being detached from real consumers and marketplaces. The disciplines of market research and environmental psychology were used to develop theory and tools.

8.1.3. Overview of Experiments

In order to understand what forces influence housing life-cycles, and to be able to discern what may occur in the future, four investigations were undertaken. These explored how different forms of housing are assessed by different groups, and whether the results correspond with specific evidence in the marketplace.

In this work, four experiments were conducted: the first two explored the opinions held by real housing consumers in the East of England, by (i) looking at the Attitudes and Preferences held by various consumer groups about different house forms, and (ii) looking at consumer responses within a Victorian conservation area. The last two experiments collected micro market information, one (iii) considering the prices of different house types over three decades in an area of South Cambridge, and the other (iv) which considered patterns of house refurbishment.

8.2. METHODOLOGICAL ISSUES

8.2.1. Validity

In any experiment, a number of concerns arise about the validity and, in particular, the extent to which the experimental results can be used to make inferences.

(a) Internal Validity:

Internal validity is the extent to which observed results allow the inference of causal relationships. Churchill (1999, p.150) noted that laboratory experiments, which offer a greater level of control over variables, tend to have greater internal validity. Concerns about internal validity can be addressed by using more than one technique of investigation, which has been done: the Attitudes and Preferences experiment was conducted initially as interviews and subsequently as a mail-back survey. The Conservation Area experiment elicited responses using different techniques.

In the two consumer experiments classification of the population was undertaken on the basis of age and occupation, however the complexity of the respondent sample made it difficult to draw highly specific conclusions about the behaviour of small market niches. Parental characteristics, the environments respondents occupied as children, and current environments all may contribute to attitudes and preferences about housing.

Non-response is another issue. Analysis of the results of the Conservation Area survey suggested that differences in response rates were primarily related to tenure, and that the response rate from the older, less educated home-owners was similar to that of the younger, more educated groups. It

would be unreasonable not to expect some bias, even if only related to the problem of functional illiteracy. The best response might be to recognise and accept the return bias on the assumption that the more affluent, and better educated groups now dominate the Cambridge-centred housing market, and appear to act as trend-setters.

(b) External Validity

External validity deals with the extent to which the findings can be generalised to other situations. One issue is the potential difference between results given in a survey or interview process, and real beliefs or behaviour. Will people act the same way they say they will? Among the 'situational variables' which can affect behaviour, considered by Belk (1991, p.170-171), are "task definition" and "temporal perspective". For example, survey does not demand or warrant the same time-intensive information gathering activities as real house purchase. Furthermore, survey responses might be influenced by idealisations which may not be integrated into a purchase decision. McFadden's structure (Exhibit 3.1) recognised that some differences will always exist, and that it is impossible to fully understand real attitudes and preferences.

One method of evaluating this problem is "...to compare its predictions to a truly external set of outcomes" (Cryer and Miller, 1991, p.209). Cryer and Miller noted that in studies involving property, sales information can be used to identify outcomes. This was done. Observed price behaviour in the local house market, which is 'truly external', was consistent with the results of the first two experiments.

Moreover, there is the use of a cross-sectional experiment to explore a historic phenomenon. This is an inevitable problem, because it is impossible to obtain responses from consumers in the 1950s or 1960s. Some reference was made to literature of that period, and older subjects were included in the surveys. The experimental results were consistent with statistics and observations in the urban environment about how housing was treated. A longitudinal study, spanning decades into the future would be desirable, however, such a survey would still not be able to look back at what might have been a specific transition. A discussion about the extent to which attitudes and preferences survive through adult life is included later.

Caution must be used when applying the results to groups which are not well represented in the responses. In particular, there were few responses from younger people of very low socio-economic status. Discussions with managers of low-income estates commented on their own difficulties in obtaining responses even about matters highly relevant to occupants, such as whether or not they are in full receipt of benefits, or experiencing building deficiencies. However, the population of such estates are not typically purchasers of houses, so it is expected that they do not exert a large influence upon the life-cycle within owner-occupied housing. Extrapolation from the experimental

findings would allow one to hypothesise that occupants of insalubrious estates focus their housing opinions on functionality. Chapman (1955, p.44-45) considered the choices of working-class households, and while there were marked preferences in furniture types and curtains, the disinterest in the exterior attributes of the house itself was evident. This suggests that in a low-income rental situation, housing opinion may be limited - there is no need to understand whether or not a house is 'impressive'. Curtains and the scrubbed front door step traditionally served as a household's external display. This is further supported by Fazio (1986, p.208-209) who referenced a body of research on 'attitude accessibility', which explored the impact of existing attitudes on ongoing perceptions. This suggested that prior experience is important in creating 'accessible' attitudes. The low response rate from poorer neighbourhoods may indicate that (as well as being areas of widespread rental) the opinions of the lowest socio-economic groups about owner-occupied houses are 'inaccessible', perhaps not formed to the level that they can be easily articulated, because such forms of housing are not an immediate part of their direct experience and perceived as largely irrelevant.

(c) Aggregation / Disaggregation

It can be suggested that some previous studies have suffered from over aggregation of different population groups. Smith (2001, p.126) believed that with the rise of 'postmodernism', efforts to "...uncover general patterns in history or human behavior...", were becoming less valid, because of an increasing "...diversity of individual, group, and cultural difference..." Accordingly, it is appropriate to attempt to find sub-groups of opinion. The inappropriateness of aggregating house forms, according to objectively measurable characteristics, was shown in the house price survey. Treating South Cambridge houses or consumers, as one bundle would obscure the changing relative values, based on 'style' or 'vintage'. Unfortunately, as data is sub-divided, individual elements come to contain relatively few observations. While disaggregation gives insight into differences which are lost in aggregation, it also implies caution with small sub-divisions of opinion, and suggests that specific focussed studies on carefully defined subjects may be necessary.

8.2.2. The East of England as a Study Area

The extent to which the findings apply to other geographical areas, even within the U.K. can be debated. The surveys were focussed on the Cambridge market area, including surrounding communities and nearby urban areas. It should not be assumed that the findings in the East of England can be directly applied to other areas, indeed the underlying theme of this research is that attitudes and preferences do vary.

There are, however, a number of reasons why considering the Cambridge-centred area is useful. Economic and social processes in the study area might be considered to be the harbinger of wider

national trends. Some very clear indicators of increasing affluence, rising education, and changing employment patterns exist. In particular, Cambridge's role as the centre of a major, and affluent, 'technology cluster' is important (Best, 1990 and 1999). Some of these trends might be noted in the statistical data prepared by the government on the East of England. Information derived from 'Regional Trends' (Central Statistical Office) indicates:

- The per capita GDP of the East of England is above the national average, and through the mid 1990s rose relative to the national average;
- After London and the South-East, the East of England has the highest per-capita level of business registrations in the U.K.;
- In 1997-98, 1/3 of households had a computer, second only to the south-east;
- The East of England has the lowest crime rate in England and Wales;
- Expenditures on Research and Development in the East of England accounted for nearly 4 per cent of gross domestic product, a higher proportion than in any other region;
- Only 15.4 per cent of the working age population possess no formal qualifications, in contrast to 18.1 per cent of the total U.K. population;
- Employment is moving away from traditional manufacturing, although in an overall sense, manufacturing does remain an important part of the economy, offering 17.7 per cent of employment, in contrast to 18.0 per cent nationally.

The Structure Plan Review 2001 (Cambridgeshire County Council, 2001), noted that recent population growth has been the highest anywhere in the U.K., as a result of both natural increase, and net in-migration, and that Cambridge is the centre "of one of the most dynamic cluster groupings in the U.K. specialising activities like: biotechnology - software development - electronic engineering - medicine - information technology - and telecommunications... Continued economic prosperity may depend on business clusters,... The Government is committed to encouraging their expansion, including the high technology clusters near Cambridge which will develop further as a world leader in these industries" (p.9).

- The population of Cambridgeshire and Peterborough is forecast to exhibit strong growth through the projection period of the structure plan:

1981	592,000
1991	668,700
1996	689,200
2016	812,300

Within the City of Cambridge, some interesting trends can be noticed, relating to housing issues. Cambridge City tends to have small households. The average household contains 2.28 persons, compared to 2.39 nationally; moreover, 35.0 per cent are one person households, in contrast to

28.8 per cent nationally (Regional Trends). The trend to small households is a significant element in *Projections of Households in England to 2021*.

This supports the use of the Cambridge-centred area for such research. If affluence continues to rise throughout the United Kingdom, what happens in the study area to the housing stock and the accompanying attitudes about houses, may predict what happens elsewhere.

8.2.3. Stability of the Attitudes and Preferences Over Time

The survey processes have considered the attitudes of different age cohorts in the present, seeking indicators of previous beliefs. Such an exercise is dependent upon the extent to which attitudes and preferences remain stable through the human life-cycle. Fortunately, this has been the subject of research and discussion, which supports the long-term stability of adult personalities, and the significance of cohort differences.

William James (1842-1910) was interested in repetitive or habitual actions. As discussed by Schultz and Schultz (2000, p.174) he offered opinions about the formation of habits which mould people. Such habits descend on "...the young commercial traveler, or the young doctor, on the young minister, on the young counselor-at-law. ...by the age of thirty, the character has set like plaster, and will never soften again."[4] More recently, Schaie and Willis (1996, p.290) summed up their research review with the statement "First, one could conclude that the most important fact about an individual's personality is the year of birth rather than the chronological age... Second, the adult personality appears to be remarkably stable." They found that "once formed, the adult personality is unlikely to change radically,..." and that these stable personality attributes will determine reactions to ongoing issues and situations.

It would seem likely that attitudes and preferences relative to buildings may have greater permanence through the human life-cycle than evaluations and attitudes to other man-made products. That built environments may amplify their own stability within the preference framework of people has been explored: "Another source of stability in adult personality is the tendency to choose environments that suit the individual's personality and to avoid those that might demand change" (Schaie and Willis, 1996, p.291). Individual housing choices are enduring, when compared with, for example, clothing choice: at any time, one has a variety of clothing in the wardrobe, and, unlike housing, replacement occurs frequently and easily. Housing remains on view; clothing of even ten years ago is rarely seen on the street, at least by persons one might like to emulate, while Interwar and Victorian houses remain commonplace. Ravetz (1995, p.9) pointed out the implications of a process: "...houses built for one social order and scale of priorities served under greatly different social conditions, becoming part of an elaborate housing hierarchy..."

[4] Quoted in Schultz and Schultz (2000, p.174) from: James, W, (1890) The Principles of Psychology, vol.1, p 121, New York: Holt.

Hence housing preferences should be, at least in part, self-reinforcing: we choose certain buildings and settings which correspond to our values and beliefs, and from then on the chosen environment acts as reinforcement, even though family and mortgage may increase and decrease over time.

Unfortunately, the situation is less clear when dealing with younger individuals, and the formation of personality has been a subject of considerable study. Costa and McCrae (1991, p.179) referenced a variety of research initiatives, which indicated "...strong evidence that personality continues to change during the interval from college age to mid-30s,..." This means that caution must be applied to the results of studying younger individuals. Their evaluation of building types may be very different by the time they become active consumers with discretion. The Attitudes and Preferences experiment noted that the respondents under 20 gave responses which were more difficult to interpret, being apparently less organised than those of older respondents.

Elder (1996) criticised some of the longitudinal studies which have documented and explored human life courses: that they have not properly reflected the events of the twentieth century "...two world wars, a world-wide depression, post-1955 affluence, the growth of the nation-state, and increase in urban living,..." (p.32). He argued that dramatic societal change or discontinuity during certain periods of childhood have the greatest impact. One of his studies, explored the Great Depression, and found differences in impact of the associated privation between children of different ages. "Though diminishing in strength over time, the difference persisted into the children's middle years in their work lives, family relationships, and psychological health" (p.37).

Proshansky et al (1983, p.62-63) discussed a process by which people develop the structures of 'place-identity' as a "complex cognitive structure which is characterized by a host of attitudes, values, thoughts, beliefs, meanings, and behavior tendencies that go well beyond just emotional attachments and belonging to particular places." He discussed the 'elusiveness' of this element as being "remote from the awareness of the individual." This cognitive system "influences what each of us sees, thinks, and feels in our situation-to-situation transactions with the physical world." Accordingly, the evaluative framework of a sixty-year old, formed in austerity before, during, and after the Second World War, will influence the response that person has to a newly encountered physical environment, such as recently-constructed houses. Given some stability of identity attributes, one can expect to see sets of unique cohort responses: only one generation will have ever had childhood experiences obtained in the London blitz. In the survey results, the 60-69 year-olds did show some characteristics which were different than their predecessors or successors: typically they showed limited socio-aesthetic discrimination between different house types. In an interview context, individuals in this group were clearly evaluating houses primarily according to the level of perceived functionality.

Among younger individuals, therefore, the set of perceptions and values expressed will be expected to exhibit some change as they mature, and are exposed to various environments. In particular, as people make the transition from their parents' homes and create new households, their awareness and opinions should continue to develop. They become independent, decision-making consumers of buildings, not just users of what their parents chose. It is possible that, in the absence of a complex and mature housing preference structure, some other construct will determine what younger people esteem. In the survey results the under 20 group showed very different preferences to the next older group, which may be attributed either to having unformed and uninformed opinion, or perhaps reacting against the preferences of their parents.

Such a cohort effect relates to design and planning processes. Often people making major decisions about property development are older members of society. Hence, the attitudes of these older cohorts are of consequence in looking at the decisions made by any one generational cohort on behalf of future generations. An older cohort's attitudes and preferences may be substantially different from those of younger active consumers.

8.3 DISCUSSION OF RESULTS

8.3.1. Chronological Ageing of Housing

Little evidence was found to support chronologically-oriented views of housing 'obsolescence'. In particular, the prices of the Victorian houses, both large and small, increased over the past quarter-century relative to comparable Postwar houses. In the Attitudes and Preferences experiment, it was seen that different groups preferred house types of different eras, and, in particular, Victorian houses were highly esteemed among what are now the primary consuming groups, while still unesteemed by the older population. It was noted that the range of opinion within groups was not constant, with the older groups, in particular the 60-69 group, showing little predisposition to any of the stimulus houses, except for a preference for those which were obviously of recent construction. Considering the 'working' occupations across the ages, it could be seen that occupation had an influence. The evidence suggested that generally older people, especially people of 'working' occupations, tended to exhibit little discernment among house types, except for a preference for the new.

In the elements of the stock studied, building age did not clearly correspond to either a permanent reduction in esteem or of market value, although it had a role. While physical deterioration is inevitable, it might be postulated that 'service' and 'high-achiever' consumers recognise that it can be controlled through ongoing maintenance and refurbishment. This was supported by the Refurbishment survey: virtually all of the people improving Cambridge houses (excluding those who seemed to be renovating as a business activity), had professional or managerial occupations. This

suggests that deterioration of the housing stock through the first part of the twentieth century, was related to societal characteristics, as well as being a result of the high level of rental, and historical events.

There may be one instance of chronological decline in the data: the Postwar (50-70s) houses appear to have lost a considerable proportion of their value relative to the other houses in South Cambridge. It is possible that this resulted, in part, from the disappearance of a 'newness' premium, as houses moved from being 'new' to being middle-aged, and came to require ongoing repairs, as well as up-dating. Salway (1986, p.22) found office depreciation rates peaked between years 5 and 10. However, this may have little effect on the physical quality of the Postwar houses. It was found in the Refurbishment survey, that professionals or managers are willing to undertake substantial refurbishment of such houses, to fulfil 'lifestyle' needs. In a housing stock collectively of increasing age, a 'newness' effect, which can only occur once, is perhaps of limited interest except to developers - of greater importance are the issues of longer-term maintenance and refurbishment.

Evidence of chronological ageing of urban areas is not incompatible with subjective market judgements. Lowry (1960) believed that style was a major factor in causing those who could exercise housing discretion to demand new buildings, much as people generally prefer current clothing styles to those of five years ago. Cowan (1965, p.1397), commenting on Lowry, suggested that subjective judgements could act to drive down property values in certain areas: "Thus style and technological obsolescence start the cycle, and depreciation keeps it going." Therein lies a possible connection between fashion, maintenance, and location: collective market judgements about building styles may drive perceptions about the desirability of certain urban areas. Hence a self-fulfilling prophesy: if an urban area consists of a form of housing which is not widely esteemed, the entire area may suffer a decline in price and receive little maintenance, thereby deteriorating further and reinforcing a belief in chronological ageing. However, the results of the renovation survey suggest that this may no longer occur. In the Renovation survey, over 45 per cent of the houses for which planning permission had been applied were of Postwar (50-70s) construction. The Postwar houses used in the House Price study appeared well maintained, both externally and internally. Such houses may not be preferred by current consuming groups, and their prices may be depressed, but this does not now imply a lack of maintenance or improvement.

8.3.2. Different Consumers Have Different Preferences

The results of the Attitude and Preference and Conservation area experiments confirmed that houses are subject to complex consumer evaluations, a logical extension from a "complex and multidimensional heterogeneity" (Annas and Arnott, 1991, p.3) that consumers must deal with in order to establish some notion of overall house value. In particular, differences were noted, between age and occupational groupings, in how they formed their opinions. This accords with the use of

occupation to segment markets. From a marketing perspective, this might be a statement of the obvious, however much architectural theory of the twentieth century has paid little attention to this possibility, and striven for universal 'International' forms of design.

While the respondents to the Attitude and Preferences surveys indicated that they were clearly individuals by expressing ranges of opinion, there were strong trends in the responses, which differed between demographic categories, including age and employment. This means that specific market segments exist. In particular, in this study, recently-constructed suburban developer houses were esteemed by those aged 60-69, and young respondents with 'working' occupations. In contrast, such houses received low scores from those aged 35-59 with 'service' occupations. Responses, as well as political canvassing in such areas, confirmed a high proportion of pre-retirement households in such neighbourhoods. Historically, few people were affluent enough to indulge in 'socio-aesthetic' consumption; now widespread affluence makes it possible. The older groups focused on the 'functional', preferring new houses, while the more affluent younger groups anticipated that authentic and reproduction Victorian houses would fulfil their own 'socio-aesthetic' needs.

Evolving attitudes and preferences about houses should not be unexpected - archaeologists and art historians both attempt to understand and document how values, world views, and social practices evolve over time. Individuals grow up in different environments, as may be defined by time and background, so are members of different 'sub-cultures', of which they are largely unaware. Usunier (2000, p.23) underlined this in describing culture at the individual level: "1. It is learned; 2. It is forgotten in the sense that we cease to be conscious of its existence as learned behaviour." As people adapt to individual contexts, attitudes are formed, and they are unconsciously applied as preferences for different products. Tarlow (1999, p.268-270) discussed "the process of becoming modern", and how current evolving world-views can be expected to be a response to, perhaps manifested as a reaction against, attitudes and understandings of previous periods.

In particular, the survey respondents may encompass a specific transition, which corresponds to the cessation of housing demolitions. The U.K., was the first country to become widely industrialised. Subsequently some areas, such as in and around Cambridge, became 'post-industrialised' in a way which may be a fore-runner of a widespread process (Best, 1990). It should not be surprising if popular meanings of property are subject to change through the process of industrialisation and de-industrialisation. Prior to the industrial revolution, most of the population was homeless or 'agriculturally landless' in tied accommodation, and it is only in the twentieth century that significant portions of the British population begin to have the control over property (Fletcher, 1976). Rapid industrialisation and urbanisation was accompanied by rental tenancies, and the Victorian population was highly mobile - almost regardless of social class they changed houses in response to rising and falling levels of affluence and neighbourhood change. Powerlessness over property or

frequent moves, implies a different relationship than secure rental tenure or ownership - it should not be surprising that attitudes among the oldest population might be a response to the environments in which their parents lived, and the values they held.

If differences in attitudes and preferences result from these processes, the preference of the older groups for new suburban houses might have origins in the importance of cleanliness and lightness indicated by these groups. Older individuals also may put a higher premium on houses which require low levels of maintenance: 'Do It Yourself' is something associated with the very recent past, and Stone (1983, p.2) saw DIY reflecting changes in relative wage rates and tax structures, which encouraged specific groups to undertake minor works themselves.

8.3.3. Relative Importance of Evaluations of Functionality and Socio-Aesthetic Meaning

The investigations into the housing marketplace in the East of England, suggest that a new paradigm can be proposed, which moves away from a focus on the material quality of houses, to one in which the behaviour of consumers towards less tangible aspects determines how value is assigned and how housing life-cycles unfold. Holbrook and Hirschman (1991) employed the term 'experiential consumption', to describe this type of behaviour relative to intangible and symbolic attributes of products, which they saw as based on cultural and sub-cultural traits. They posed questions for which one would expect the responses to vary by culture and sub-culture, not by objectively quantifiable attributes: "Which painting is the most beautiful?", "Which tastes better, chocolate or strawberry?" and "What makes you happy?" (p.189). This relative significance in decision-making may be amplified, if consumers put a disproportionate amount of emphasis on what they see as the most important aspect of evaluation, as suggested by Slovic (1975, p.286) and Tversky et al (1988, p.375).

One of the clearest findings of this research was the increased emphasis which more recent generations of consumers, in particular higher status individuals, tend to give to the less functional or tangible attributes of houses. In the factor analysis of the Attitudes and Preferences responses, to younger groups, especially those with managerial and professional occupations, the 'socio-aesthetic' dimension was most important, while for the older groups, in particular those aged 60-69, and those in 'working' occupations, functionality was relatively more important. Similarly, the Conservation Area study found that the 'new economy' group paid more attention to the appearance issues of their streetscape, while the 'old economy' group were concerned with more 'functional' issues, and had less apparent regard for external appearance. In one notable survey/interview, with a couple in their early seventies and their grandson in his mid-twenties, the grandson became most interested in the deprivations faced by his grandparents in the early post-war period - he admitted that he simply had never considered that they might have lived without indoor plumbing, heat, or a sound roof. The older couple treasured their 1960s house, bought new, and were very appreciative of its

functionality, cleanliness, and lightness, in contrast to their grandson, who saw it as 'okay, but boring'. This helps explain the comments made by Richard Crossman, a former Labour housing minister, when supporting demolition and redevelopment in north London: "These rat-infested slums must be demolished. Old terraced houses may have a certain snob-appeal to members of the middle class but they are not suitable accommodation for working-class tenants" (Thompson, 1979, p.35). Different groups saw the utility of the houses in question differently: if the 'working' group's specific needs were to be met, clearance was in order, even though another group might esteem the houses.

Many sources of the 1950s to 1970s generally presented housing choice within a logical framework, as if undertaken by a computer which processed a defined and rationally objective set of unchanging preferences to make choices. If attitudes and preferences are rooted in the objective, and are uncomplicated and unchanging, quantified building life-expectancies might be created. Holbrook and Hirschman (1991, p.179) saw the study of consumer behaviour as a progression away from this "early emphasis on rational choice", to the integration of understandings of increasingly complex psychological, emotional and social phenomena - that "fantasies, feelings, and fun" are important for many classes of products. Bernstein (1998) discussed the attraction of "the Victorian concept of rational behaviour" (p.246). "Human beings were always assumed to be rational... which simplified matters because it makes human behavior as predictable as nature's - perhaps more so" (Bernstein, 1998, p.330-331). In a 'rational' world, "Measurement always dominates intuition: rational people make choices on the basis of information rather than on the basis of whim, emotion, or habit" (Bernstein, 1998, p.246). Until the late twentieth century, the ongoing shortage of housing of acceptable quality, made it possible to believe that virtually all consumers were interested only in the functional aspects of the utility offered by their dwellings. This belief was too extensive a generalisation. People in industrial economies, of limited affluence, when simple adequate housing is in short supply, apparently behave in such a manner, but wealthy Victorians did not fall into this mould - at least not based on the evidence they left in the form of the houses of the affluent.

This change has been noted beyond housing. Jackson and Marks (1999) explored changing U.K. consumption patterns in the 1954-1994 period and divided the items of household expenditure into needs which were 'material' and 'non-material'. They found that food consumption, a highly material need, had increased by 29 per cent, while recreation and entertainment rose by 398 per cent. They found that "...expenditure on clothing has increased by over 200% in real terms, a fact which is attributable more to the increased role of clothing in relation to identity and participation needs, than its role in terms of protection. In particular, the fashion-dominated world of women's clothing accounts for the lion's share of this increase" (Jackson and Marks, 1999, p.431). On an overall basis, they found expenditures on material needs to have increased by about 50 per cent in real terms, while expenditures related to "non-material needs satisfaction" to have increased by 160 per cent. Ropke (1999) attempted to explain "insatiable wants", and proposed that while 'absolute

wants', akin to Jackson and Mark's 'material needs', could be satisfied, other wants were 'relative' and could be insatiable. "Consumption has acquired a new and very important role in relation to the formation of self-identity under the conditions of late-modern society" (Ropke, 1999, p.410). Ropke related this to a decreasing importance of membership in communities in defining identity, being replaced by a self-identity increasingly defined in terms of consumption. Hence, people undertaking substantial refurbishments of their houses, were apparently affluent, and motivated by 'life-style' needs. With respect to environments, a Shropshire housing survey by Goodchild (1974, p.160-162) concluded that "Middle-class people tend to place greater stress on aesthetic improvements than working class people." Assael (1998) noted: "...upper classes are likely to emphasize style and color in purchasing appliances, whereas lower-class consumers emphasize appliances that work" (p.415). Assael also referenced an AT&T study of the 1970s which found that "Lower-class consumers were not interested in a decorative or modern phone; they just wanted one that worked" and found that even marginally more affluent consumers wanted "designs and colors" (p.417).

Brown (1994, p.81) ascribed marketplace changes to the rise of 'postmodernism' in the developed world: "...it can be contended that postmodernism is characterised by the celebration of ephemerality, reflexivity, self-referentiality, quotation, the quotidian, anarchy, allegory, and, not the least by hostility to generalisations." With increasing general affluence, long-term economic and political stability, and the capability of retrofitting buildings with various amenities, it appears that the value system which drives single-family houses in affluent areas has changed. Beesley and Russworm (1989, p.27) explained this process somewhat differently, and separated 'objective social indicators' from 'subjective social indicators', with an increasing importance of the latter: "Subjective social indicators are measures drawn from the experience of, and the perception of what is important to an individual. As such, these indicators are internally rather than externally derived." They structured their analysis in terms of Maslow's hierarchy of needs, and saw some consistency: as the 'most primitive needs' were filled, it was to be expected that environments became increasingly evaluated according to Maslow's higher levels.

The 'hierarchy of human needs' (Maslow, 1970) has frequently been used to interpret marketplace issues. This organised human demands in terms of five classes of need (Exhibit 8.1)

Exhibit 8.1 Maslow's hierarchy of needs

From Maslow (1970), pp 13- 23

MORAL NEEDS	
Self Actualisation Needs	Love
	Truth
	Service
	Moral Needs
	Justice
	Perfection
	Aesthetics
	Meaningfulness
Esteem:	Self-esteem
	Esteem by others
SOCIAL NEEDS	
Belongingness and Love	Belongingness
	Love/Affection/Acceptance
MATERIAL NEEDS	
Safety	Security / stability / dependency / protection,...
Physiological needs	Air / water / food / shelter / sleep

The hierarchy was Maslow's reaction against mathematical and reductionist approaches to human behaviour, which he believed did not reflect true human complexity. Such a 'humanistic' approach envisages people as behaving fundamentally differently than laboratory animals or machines, in particular with regard to the higher needs. Lutz (1999, p.315) supported the ongoing conceptual validity of Maslow's model: "...even its critics accept its powerful impressionistic appeal, particularly when it is investigated across societies at different stages of development." In Maslow's earlier work, he suggested that as one set of needs are fulfilled, people move in a general progression of needs fulfilment on to successively higher levels. If a need at any level was frustrated, higher needs would not emerge (Mook, 1987, p.518). Given ongoing satiation of lower level demands, people continue to strive until they might ultimately attempt to satisfy the need for 'self actualisation'; which is to "realize, all of one's unique potential; to be all that one can be" (Statt, 1997, p.97-98). Later Maslow added levels of complexity, in which multiple levels could be addressed at one time. This suggests trade-offs; where some individuals may reduce consumption in one area, in order to consume more at a 'higher' level. Certainly, an owner of a larger Victorian house in South Cambridge, could exchange it for a more modern house on a bigger piece of land, with a garage, only a few minutes walk away, but would have to accept the Postwar design, something which many consumers are reluctant to do. Some caution with regard to Maslow's model is necessary, because of its origins in, and orientation to, the American culture, so it views humans as relatively free of conventions and constraints. Furthermore, empirical research has had mixed results relative to Maslow's theories, although case studies which follow people through changed circumstances are more supportive (Mook, 1987, p.520).

Maslow contributed a clear and detailed model, but there was substantial, although less comprehensive, precedent from the economists. Keynes (1931, p.365-366) saw two classes of needs "those needs which are absolute in the sense that we feel them whatever the situation of our fellow human beings may be, and those which are relative only in that their satisfaction lifts us

above, makes us feel superior to, our fellows." Galbraith proposed a similar overall structure: "When man has satisfied his physical needs, then psychologically grounded desires take over" (Galbraith, 1958, p.141).

This division between the 'socio-aesthetic' and the 'functional' can be used to interpret much housing literature. Until the 1970s functionality was the key aspect of housing demand: "Critical questions occur. Are the present and potential occupiers of building stock seeking the best accommodation to support their activities, or merely 'good' accommodation? Is an optimal or a satisfactory level of functional performance required?" (Nutt et al, 1976, p.39). Twenty-five years later, a very different form of satisfaction could be discussed: Andrews (2001, p.201-202) defined 'quality-of-place' (QOP) as "... a feeling of well-being, fulfilment, or satisfaction on the part of the residents or of visitors to that place.... During good times the popular definition of QOL [quality-of-life] expands to include access to amenities, recreational opportunities, pleasant communities, a pristine environment, and a satisfying personal and professional life. It is during these good times that QOP gains political currency,..."

This shift provides a new perspective on much material written dealing with building 'obsolescence'. While the classification system of forms of obsolescence remains an appropriate framework, work which focussed primarily on functional matters is inadequate. While buildings are indeed subject to physical, functional, and environmental obsolescence (Bowie, 1982), in a wealthier culture the dominant cause of obsolescence or physical deterioration, and whether or not amelioration is undertaken, is determined primarily by the way successive groups of consumers ascribe value to various building types, based on their 'socio-aesthetic' attitudes.

8.3.4 Manifestations in the Marketplace

A number of observations were made from the experiment results, relative to the housing in the Cambridge- centred area.

(a) A Preference for the historical

On an overall basis, in the experiments there was a marked preference for the Victorian houses among younger consumer groups, especially those of higher occupational levels, although the pre-consumers apparently did not share this. The 'service' groups aged 20-49 ranked Victorian houses in first place in the Attitudes and Preferences experiment, and the dominant 'new economy' group in the Conservation Area study focussed on planning control of the house facades. The increasing share of the population represented by 'service' or 'new economy' groups suggests that a trend to the historical is likely to continue. This process is widely referenced in the conservation and heritage literature. For example, Andreae (1996, p.142) noted "It was only during the 1970s that the...

[widespread urban demolition and redevelopment] …began to change, due to a shift of public perception and the beginnings of the widespread growth in interest in the conservation of historic buildings."

Nasar (1994) noted some apparently widespread commonalities of preferences relative to houses, including a preference for 'the vernacular', in an American setting. Beasley (1994), in her consideration of design control in a variety of American cities, found a widespread preference for historical forms. It is possible that a preference for the historical is universal, provided that certain conditions are met. Packard (1959, p.123) related a preference for the old as resulting from a reduced need to pursue status through overt consumption: "In clothing as in other matters, the really rich prize age, whereas men well below them in status prize newness. The New England aristocrat clings to his cracked shoes through many re-solings and his old hat." Goulding (1999, p.648) noted a "…shift of museums and heritage from the realm of high culture into mass culture" and considered how different groups derive meaning from such sites. One aspect appears to be a level of wealth that allows one to consider more than functionality. Another important part of this process appears to have its origins in the level of knowledge about the cultural setting which surrounded the creation of parts of the built environment, and the way the setting is forgotten. This may serve to define what is accepted as historically desirable. Goulding (1999, p.655) argued that there is a difference between nostalgia and memory: "…while memory can involve depression, nostalgia looks back only with elation." Light and Prentice (1994) proposed that Victorian industrial sites became subject for preservation only after there was no first-hand knowledge of the working conditions and child labour associated with them. The effect of the disappearance of memory was readily apparent in an interview context with regard to the passages of the Interwar Council-built 'Addison' houses in the responses in the Attitudes and Preferences experiment. Clearly the younger respondents, who esteemed them, did not know such houses were council-built so evaluated them without the detailed knowledge possessed by previous generations.

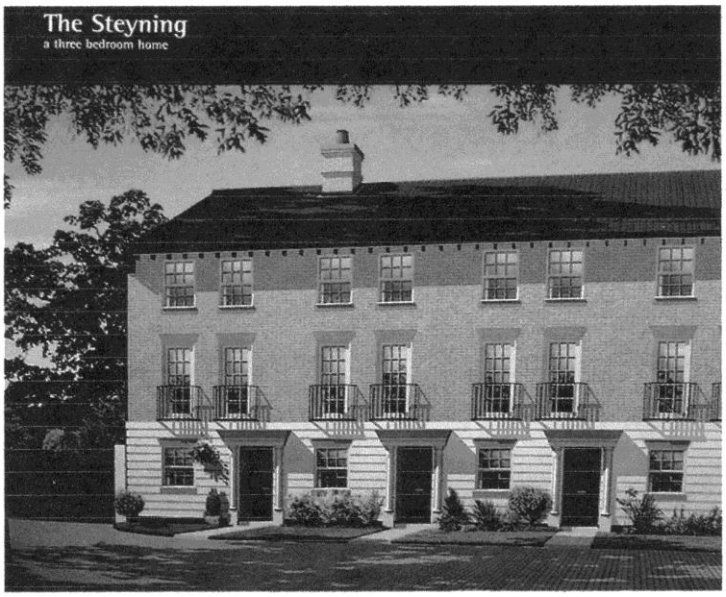
The same Victorian dwellings which were seen by a previous generation of consumers as 'incurably' obsolescent and suitable only for demolition, are now subject to improvement. Lowry (1960, p.265) argued that stylistic and technological obsolescence, not deterioration, was what caused the high income groups of his time to prefer new housing. He did not foresee that preferences could evolve so that affluent groups with choice might come to prefer older houses, to the extent that they would overcome technological obsolescence through extensive refurbishment activities.

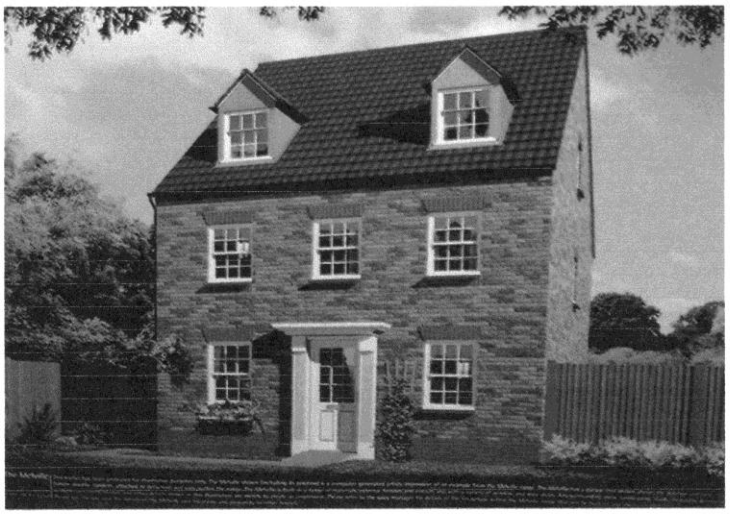
(b) Role of reproductions

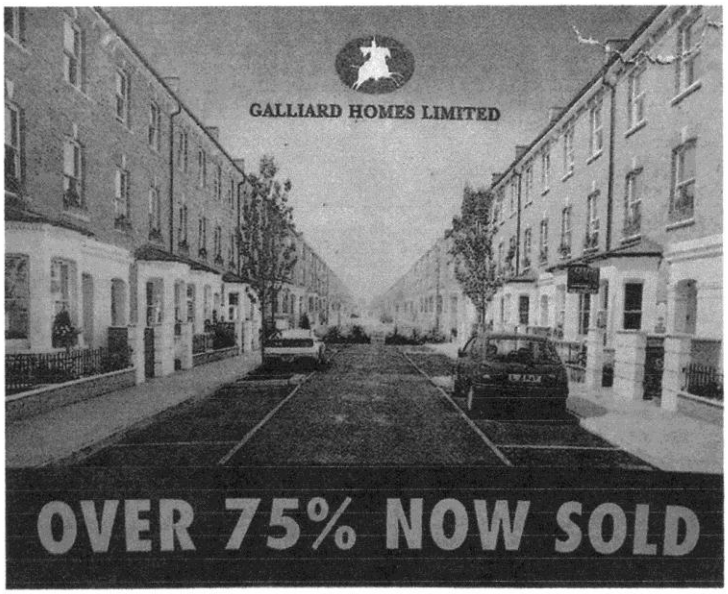
One observation was that most active consumers (aged 20 to 79) could discriminate between authentic historical houses and reproductions. Not only was this clear from the estimates of age made, but also was shown in the assessments of the 'cleanliness and lightness', as noted on the perceptual maps. However, with regard to the 'socio-aesthetic', as expressed on the perceptual maps, the reproductions were evaluated and scored very much in the same manner as their prototypes. This implies that many people believe that the social messages offered by these two forms are more-or-less the same. However, consideration of 'prestigiousness' shows that for the consumers aged 20-69, 'service' groups ranked authentic Victorian houses higher than Reproductions, the 'working' group ranked the Reproductions higher. This may reflect some haloing of prestigiousness to the relative importance of the tangible and intangible. 'Working' groups put a higher weighting on 'functionality', so believe that a house which performs better in those respects should be more 'prestigious'. The perceptual maps suggest that consumers who emphasise the 'socio-aesthetic' will prefer the authentic, however those more concerned with 'cleanliness and lightness' will prefer the Reproductions.

Consumers also discriminated between 'reproductions' and new suburban builder houses, even though the latter include historical allusions. For most consumers, the socio-aesthetic worth of a quality reproduction is similar to an authentic Victorian house, although a new suburban dwelling, with a few superficial 'historical' features is not. Over the course of this study, the offerings of suburban developers may have changed. The 80-90s 'new' suburban houses used in the study were not serious reproductions, however in 2001, serious 'reproductions' (Exhibit 8.2) are on offer.

Exhibit 8.2: Reproduction house forms currently on offer from house builders.







(c) An increasingly old built environment: Future age composition of the housing stock

(i) Methodology and Assumptions

As previously noted, a housing model which incorporates depreciation leads to the expectation of ongoing replacement of dwellings, either through government or market action. However, the survey explorations, together with the Cambridge market price data, suggest that little housing will be demolished in the future, unless there is a dramatic shift in consumer attitudes, to the extent that even conservation policy can be changed substantially. The Renovation survey indicated significant expenditure on the Postwar (50-70s) houses, the least desired part of the Cambridge stock, which indicates that those houses will not be allowed to deteriorate to the state in which demolition is likely. In particular, the esteem assigned to even very ordinary Victorian workers housing, by educated and affluent consumers, implies that any building over a hundred years old may become an inviolate part of the urban fabric.

This suggests that the stock will increasingly be composed of older houses, inevitably located in older neighbourhoods. A projection of the future composition of the housing stock in England, was undertaken using methods employed in predicting future human populations (Wunsch and Termote, 1978, p.9-17). It embedded the following assumptions:

An annual national housing 'demand' was developed using data from the Department of the Environment's (DoE) 1999 *Projections of Households in England to 2021*. This predicts an increase of 3.994 million households between 1996 and 2021, which need to be accommodated.

It was assumed that housing supply would meet demand, that is, new housing requirements would be filled immediately. Each net new household was matched by one net new unit, on an annual basis. While possibilities exist such as delayed household formation in response to housing shortages, these are not likely to represent an alternative housing supply in the long-term.

The DoE housing projections embed a decreasing size of households, and in particular the massive number of new single person households expected. This does not necessarily imply any reduction in space requirements; the DoE believes that increasing expectations will mean an ongoing demand for more space per person. This means that future demand from small households will not likely be met in the longer-term through subdivision of large units. This was supported by the results of the Refurbishment Experiment, which indicated that much of the enlargement of Cambridge houses was done by households with small families.

The model was developed for England as a whole. Internal migration, and the propensity of new immigrants to settle in certain regions, were ignored. This implies that population growth occurs

equally in all regions. However, migration may have a significant impact on local processes.

Linearity between each five year point in the DoE statistics and projections has been assumed in population growth, housing demolition, and housing production. This assumption, while yielding short-run inaccuracies, will not affect the long-term projections.

A set of assumptions about the rate and distribution of demolitions was made.

- The mean national demolition rate between 1991 and 1996 was used. That the rate continued to fall between 1991 and 1996 has been ignored. This is a significant issue; if it continues to fall this assumption implies the understatement of the numbers of 'old' houses. A further possible source of error results from the lack of good quality regional demolition statistics. It is likely that demolition is concentrated in certain areas.

- The rate of demolition is not evenly distributed. Accordingly, the mean 1991-1996 demolition rates have been distributed as follows:

Overall Demolition Rate: .0705% of total housing stock per year

pre-1871: 0.209% per year

1871-1890: 0.110% per year

1891-1918: No demolitions. The number of dwellings claimed to have been built in this period has recently shown net increases, presumably due to subdivision and conversion, however the model assumes that such activities in the future will balance demolitions.

1918 to twenty-five years before each analysis: balance of the demolition.

Housing less than twenty-five years old: no demolition.

(ii) Results of Projections

Exhibit 8.3 shows the probable age distribution of the housing stock, until 2021, together with some historical data. If current housing processes and conditions continue, by 2021 approximately 21.5 per cent of the housing stock will be over 100 years old, and approximately 64 per cent over 50 years, which is in distinct contrast to the new housing environment which was assumed by researchers if the 1960s and 1970s.

Exhibit: 8.3: Projections of Future Age Distribution of the Housing Stock (England)

Dwelling	Date				
Age	1971	1996	2006	2016	2021
0-24	38.7%	23.5%	19.2%	17.6%	17.3%
25-49	24.2%	29.1%	25.2%	20.3%	18.4%
50-74	14.4%	21.5%	22.6%	24.6%	26.0%
75-99	13.3%	9.9%	13.9%	16.0%	16.8%
100+	9.3%	16.1%	19.1%	21.5%	21.5%
	100.0%	100.0%	100.0%	100.0%	100.0%

The data is presented graphically in Exhibits 8.4 and 8.5. Exhibit 8.4 shows housing stock age, past and future, by date of construction. In particular, according to this model, how housing, once built, remains indefinitely, which is in contrast to the era before 1976 (Exhibits 2.7 and 2.8).

Exhibit 8.4: Future housing stock in England by date of construction

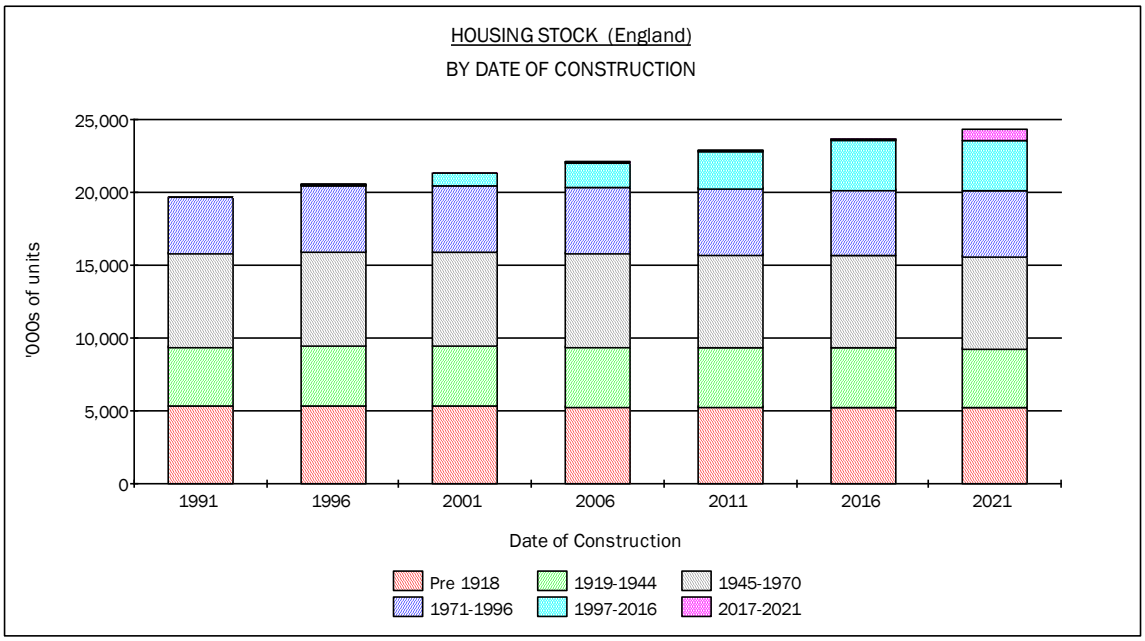
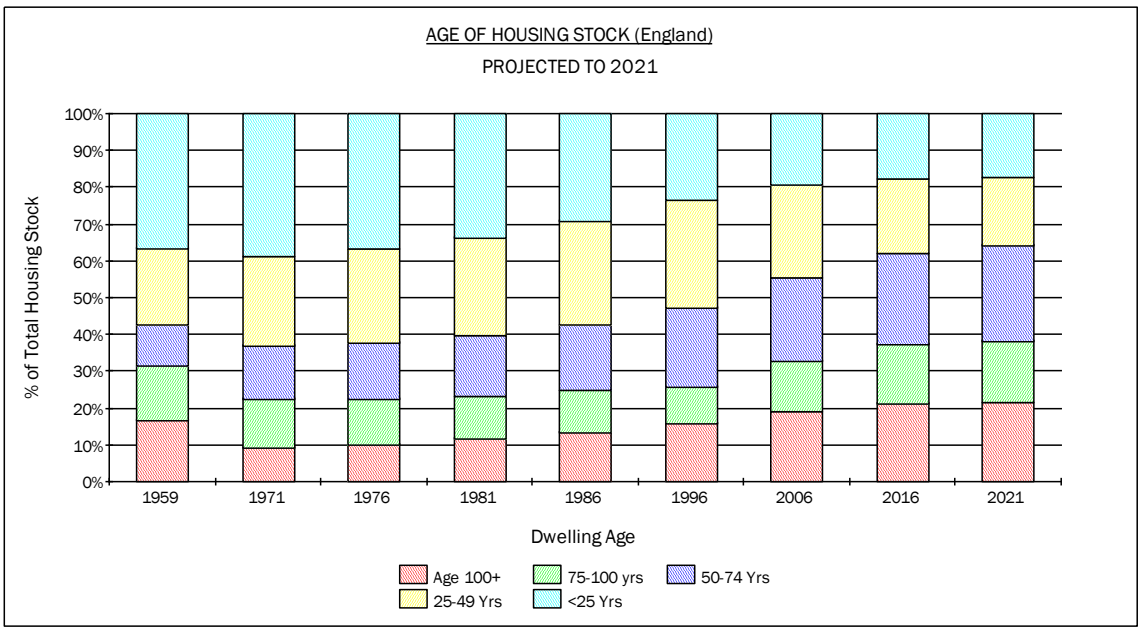


Exhibit 8.5: Future age distribution of the housing stock in England



A number of issues exist in such a projection:

- Uncertainty in household projections: The DoE projections themselves are based on specific assumptions.

- Demolition rates: Demolition rates may not remain constant into the future. Change could occur: for example it is possible that houses built in the 1950s and 1960s could come to be demolished in significant numbers to access their sites, in particular those on larger pieces of land.
- Regional Situations: The numbers are based on national averages, and differences between regions in population growth and demolition rates may mean that in some regions the future may be different.

(iii) Discussion

If current conditions persist, the housing stock will become increasingly old. The rates of demolition, together with the structure of consumer preferences, suggest that, in general, houses now can be expected to last hundreds of years, which indicates that ultimately the population of the U.K. may be housed primarily in buildings and neighbourhoods centuries old. If the ability to renew the stock disappears, due to high esteem for the historical, as legislated through conservation policies, the creation and development of any new neighbourhoods has an importance as never before: opportunities to redevelop neighbourhoods to reflect new demands, or deficiencies in the existing stock, may have disappeared.

8.4 FORECASTING

An underlying theme of this exploration has been that it is difficult to model processes which are uncertain, and for which the underlying motivators are subject to variation. Nevertheless, based on the findings, some predictions might be made, with the qualification that the way consumers assess and assign value to houses may change again. A longer-lived housing stock, with consumers assigning higher levels of value to socio-aesthetic matters has various implications.

8.4.1 Market-Led Planning and Design

The future of the built environment appears to be now firmly based in market processes rooted in the 'socio-aesthetic', which do not reflect a preference for newness, and this may be of consequence throughout the developed world. Such a state is very different from one which is architect or planner led. Taylor (1973) was highly critical of architect and planner-devised environments which "...could be dismissed as a mere frivol if it were not all too typically indicative of the kind of secret world of illusion which so many architects and architectural critics nurture within them, in defiance of the real world of people" (p.19). Saegert (1987, p.99) noted, "Planning theory combined elements of economics, political science, geography and sociology but mainly overlooked the psychological level of analysis." Based on the insights which were gained in the experiments, this situation occurred

because psychological insights into consumers were, until recently, not necessary - most consumers would have been concerned with 'functionality'.

When a vast, unfilled demand for basic functional housing exists, it is reasonable for the population to assign the duty of providing housing to architects and planners. However, when large portions of the population begin to demand housing which meets socio-aesthetic expectations, the market is unlikely to allow architects and planners to control design. From a regulatory perspective, in the United States this has been manifested through Design Review, and in the United Kingdom in the form of popular pressure for the creation of Conservation Areas. Over the past two years, Cambridge City Council has markedly increased the capability of members of the public of influencing proposed developments.

It is likely that speculative builders, who have always had to deal directly with consumers, may find their task of matching dwelling with consumer even more important. Unlike the 1930s, when a more-or-less standard semi-detached house was built across the country, with few variations, current house-builder suburbs around Cambridge offer a variety of individual house designs. This might mean a longer-term drift towards the practices and products in the United States, where houses are often packaged in a variety of 'styles'.

8.4.2. Increased Esteem for the Postwar Stock

The Renovation Survey indicated that the Postwar (50-70s) stock is in receipt of considerable investment, so is unlikely to suffer physical deterioration. This suggests that such houses will survive unless the value of their sites for alternative uses, perhaps new, larger houses, rises to the extent that demolition occurs, regardless of the state of the existing houses. Moreover, the changing levels of esteem for older housing forms does suggest, that as in the case of Victorian industrial sites, as the children of the generation for whom they were built are replaced by the grandchildren, Postwar houses may become esteemed. This suggests that the houses now in the stock are likely to remain indefinitely.

8.4.3. Role of Reproductions

The data suggests that reproduction houses will continue to be built. This is clearly not because consumers are fooled and believe they are authentic, but because much of the meaning of the authentic prototype accrues to the reproductions.

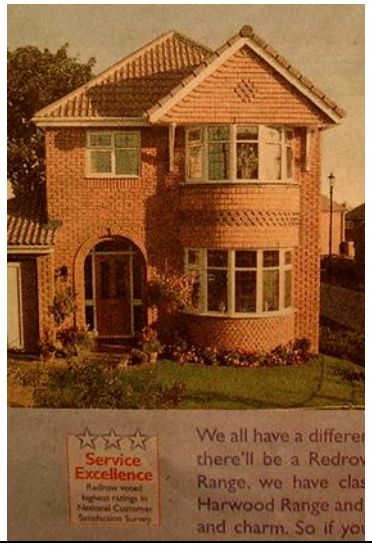
It is of interest to conjecture about future reproductions. *The Things We See: Houses* (Brett, 1947, p.21) included a blank box cynically noted: "Neo-Victorian: does not yet exist but no doubt soon will." Brett's prediction that, like Mediaeval and Georgian houses, the Victorian houses his

generation saw as undesirable would eventually spawn reproductions has come to pass. The research showed, that among current active housing consumers Reproduction Victorian houses were highly esteemed: presumably any deficiencies due to the differences with the original, are offset by the higher levels of 'serviceability' and 'cleanliness and lightness' assigned to new construction. It is reasonable to expect that quality reproductions will remain a standard of much new U.K. house supply.

Accordingly, in the dawn of the twenty-first century it seems reasonable to repeat Brett's exercise, perhaps with greater certainty, and leave more blanks for future housing forms (Exhibit 8.6):

Exhibit 8.6 Present and future reproduction houses

Interwar Reproduction: Already exists among the products offered by housebuilders.



Postwar (1950-70s) Reproduction:
does not yet exist but no doubt soon will

8.4.4 Frustration and Conflict

It is clear that housing can be an 'insatiable' need. Accordingly, with affluence, people will continue to increase their expectations. This demand, combined with pressures for conservation represents a potential problem.

The Conservation Area experiment found that the respondents of the highest occupational groups, tended to indicate less esteem for the area than did other professionals and managers. In the

Prices Survey, it was seen how the larger Victorian houses had substantially increased in price relative to other house forms. The House Refurbishment survey showed that people were enlarging their houses to achieve 'life-style' needs. This suggests that, with increasing incomes and accompanying expectations, people will expect more than two-bedroom Victorian workers' terraces. The Economist (2001) suggested that damage was being done to Cambridge's high-tech cluster by local planning policies. It pointed to the "appalling and immoral" (p.28) behaviour of the 'haves', living in South Cambridgeshire, who oppose new development. Without the houses which managers and professionals expect, the attractiveness of the area to new business may be compromised. This suggests that confrontation may occur, and that pressure will be brought on government to relax planning restrictions, both those which prevent suburban development and the conservation policies which may impede change within the existing urban stock. Indeed, Culture Secretary Tessa Jowell, speaking at the Institute of Public Policy Research in late 2001, warned that excessive protection of heritage was "a barrier to new and exciting buildings" and cautioned about "fossilising buildings" (Littlefield and Booth, 2001, p.3). It is possible that the next generation will believe that attempts to preserve virtually everything may be compromising their own welfare and create a different form of development control. This represents a change in market attribution of value, and could lead to increased levels of house demolition.

8.4.5 Introduction of New House Forms

The wider marketplace is cautious about High-Style houses. This suggests why suburban house builders act very conservatively. However, this does not indicate that new house forms are not possible, but that more research is required to understand how to bring them to market. In particular, the results suggest that new forms should be admitted to the marketplace on an evolutionary basis, so they can be associated with pre-existing, familiar houses, as are the reproduction houses.

It might be argued that while affluence allows consumers to emphasise the more abstract services provided by houses, it does not seem necessary that such is always manifested as a preference for the historical. In fact, in the Attitudes and Preferences experiment, relative to 'impressive', 'interesting', and 'prestigious', the High-Style houses ranked among the top three types for the 'service' groups aged under 60. However, they were scored low relative to the 'serviceability' adjectives. This perception of low 'liveability', 'usefulness' and 'comfort', perhaps together with some unexplored risk factor, dominated the overall evaluation of such houses. If this could be overcome, High-Style houses could be a different manifestation of affluent choice. It might be suggested that very wealthy people, do create High-Style houses. The risk of a house which is not 'liveable' or 'comfortable' and may be difficult to resell, is relatively unimportant to people to whom their house is not their single biggest investment. Further exploration is required in this area, to understand how to make new forms acceptable.

8.5 FUTURE RESEARCH

An number of possible research initiatives emerge from these studies. In particular, better understanding of the life-processes of houses will assist planners and designers to improve the long-term utility of the stock, thereby contributing to urban sustainability. Additional confirmation of the results of the Attitudes and Preferences experiment could be obtained by undertaking a similar study thirty or forty years in the future, and comparing the results. A number of more immediate possibilities exist.

8.5.1. Explorations in Other Cultural/Geographical Areas

The Cambridge-centred area was of interest due to its 'new-economy' base. It would be of interest to contrast these results with those in an area in which 'smokestack' industry still dominates the local economy. Further afield, explorations in developing countries would help to build a more comprehensive understanding of how value was assigned to different types of houses during various stages of economic development.

8.5.2. Further Use of Existing Data

Even acknowledging the cautions of Boon (2001, p.3) about quantifications of consumer opinion, there are further techniques for extracting meaning from the collected data. In particular, the issues of relating data in multiple dimensional space effectively limit graphical explorations. Further work in developing an understanding of the propensity to purchase different types of houses by different groups requires further mathematical work. In particular, the models developed by McFadden (1986) and explored by Cramer (1991) are promising ways of developing further insights, although housing offers a number of specific complexities which must be dealt with in such a model (place-fixed, only one can be purchased, long-term investment characteristics,...). In particular, some of the collected data was not fully utilised, for instance the consumer surveys asked about parental occupation, foreign travel, where one was brought up and in which type of house. A model which used a full range of information, might be able to give better insights into how individuals construct their assessment of houses, which might predict their preferences, and ultimately their propensities to purchase certain types.

8.5.3. Formation of Adult Opinion

While the Attitude and Preferences experiment collected responses from under 20 'pre-consumers', no effort was made to understand how the more ordered responses of active consumers emerge. If it was possible to relate formed adult preferences to juvenile responses, it would allow those involved in the development of housing to be better prepared for the next generation.

8.5.4. Expansion of Attributes Studied

In the Attitudes and Preferences study it was apparent that there were additional ways in which people evaluate houses. The responses to the High-Style houses suggest an incompleteness in the model, especially with regard to beliefs about the investment properties of houses. In particular, some information regarding perceived risk and future growth prospects, perhaps including the expected ease of future resale, would give additional insights.

In the Conservation Areas study people were asked to rank the features of the houses which were most important for the local authority to control. While front doors ranked high among the groups of higher education/occupation, it is likely that this does not imply keeping the original, cheap doors. It would be interesting to understand what types of doors would be acceptable. This would assist in administering conservation policy; the increased knowledge would make conservation decisions about 'old and ordinary' buildings and areas less arbitrary.

9.0 CONCLUSIONS

Housing life-cycles have not been a major area of recent study, although they are fundamental to the nature of cities and buildings. Accordingly, there is no coherent body of research. Moreover, most of the relevant work was done twenty years ago or more, when slum clearance was still under way, and houses did seem to have finite lives. Older research suggested that their life-cycle was a one-way process to inevitable demolition and redevelopment, and that increasing affluence would allow people to express a preference for new and modern houses. Changing technology would be one driving force in house obsolescence. Research at that time also lacked many models and tools now available. One example is the emergence of option pricing methods. In the 1970s, discounted cash flow techniques were used as valid ways to understand building value and determine when to demolish and rebuild. However, real option pricing, developed in the 1990s, shows that the nature of value is complex, and that a bureaucrat using unaugmented discounted cash flow methods could come up with models of building value which could be very different than those expressed by the marketplace. Psychologists and market researchers have developed methods to help investigate people and their actions, and theory to explain them. The computer enables analyses which would have been extremely slow and expensive thirty years ago.

Using methods and theories drawn from market research, economics, and environmental psychology, this research attempted to identify what factors govern the life processes of houses. Various older sources attempted to categorise deterioration and obsolescence, however it was postulated that even matters of physical deterioration and neighbourhood evolution can be understood in terms of how value is assigned to different houses, by successive generations of consumers. Certainly, decay and undesirability in many Victorian neighbourhoods were reversed by people willing to invest in old buildings, rather than undertaking demolition and redevelopment.

The findings indicated that a simple chronological model of housing life-processes is inappropriate. Certainly, in contrast to older predictions, many survey respondents indicated a preference for the oldest houses. Similarly, the primary consumer group in the Conservation Area survey indicated a high level of esteem for a neighbourhood which, forty years ago, was at risk of slum-clearance.

Both the Attitudes and Preferences experiment and the Conservation Area study demonstrated that there are different segments within the consuming population. In particular, the ‘old’ population of the conservation area generally perceived the area as undesirable, in contrast with more educated ‘new economy’ residents. The Attitudes and Preferences experiment confirmed differences between various occupational groupings’ assessments of various house types.

Furthermore, it was clear that consumer opinion is subject to change over time. The experiments demonstrated that as well as differences between occupational groups, people of different age cohorts tended to prefer different house types. In particular, it was found that the significance of the less tangible attributes, perhaps ‘style’ or ‘vintage’, had increased, particularly among professionals and managers, which is important because evaluations of what might be, for example, ‘impressive’ or ‘prestigious’ are human constructs, and are not immutable.

Consumer opinion is manifested in a willingness to pay more for certain house types. The house price survey in South Cambridge indicated that, over the past three decades, successive waves of

consumers have assigned varying relative financial values to different house types. Such price changes concurred with the evolution of consumer preferences indicated in the surveys. Younger, more affluent consumers prefer Victorian houses, so as such consumers have become a more significant element in the marketplace, prices of Victorian houses have been bid up, compared to forms in which current consumers perceive less value.

In the Attitudes and Preferences experiment, while younger people, in particular those in professional and managerial occupations, assigned increasing levels of importance to the less tangible aspects of houses, the preferences of older groups were dominated by matters of functionality. The Conservation Area survey found that older 'working' respondents tended to focus on functional aspects, while the 'new economy' groups concerned themselves with the streetscape. This is consistent with rising levels of affluence, as described by various theorists. The implication is that it is now difficult to determine what constitutes a desirable house. Accordingly, understanding consumer behaviour will be necessary in order to create buildings with maximum long-term value.

Many individuals with discretionary funds choose to purchase increased housing services, and demand larger houses capable of satisfying their less tangible needs. Applications for planning permission indicated that middle-aged professionals and managers, with small families, expand their houses largely for 'life-style' reasons. This suggests that housing demand is essentially insatiable.

There are several implications to be drawn from these observations. Perhaps even the term, 'life-cycle', which suggests birth, life, and death, is inappropriate to describe the complex processes defining the life of houses. Within the Cambridge stock, even the least-esteemed elements are now maintained and extended, suggesting that, in the current consumer belief structure, ongoing investment may halt physical deterioration.

East of England consumers no longer treat housing as a disposable commodity. The esteem and consequent value which is now assigned to older houses suggests that, without a fundamental change in the way consumers assign value, a large proportion of these will probably endure indefinitely. This means that opportunities to rebuild cities or neighbourhoods are likely to be rare, so it is important that buildings be created to serve in the longer term. To do so, better insights into the mechanisms by which successive generations of consumers evaluate buildings may be obtained through ongoing research. It is possible that a change in the attitudes and preferences held by some future dominant consumer group could alter the life-cycle of houses again. Ongoing rising affluence could lead to a demand for larger and better houses, which could raise 'liquidation values' by increasing the prices of redevelopment sites to the point that demolition of even well-maintained houses becomes feasible.

Research into the life-processes of buildings will become of increasing importance, as the United Kingdom comes to contain greater numbers of 'old' buildings. It was noted that conservation area policy devised thirty years ago is now being applied, perhaps inappropriately, to neighbourhoods which were once considered candidates for clearance. Research will help to understand what to control in 'old but ordinary' neighbourhoods, in order to ensure that ageing cities remain vital and sustainable.

BIBLIOGRAPHY

A

Abouchar, A. (1983). *The Depreciation of Depreciation in Economic Theory*. Department of Economics and Institute for Policy Analysis. Toronto: University of Toronto Working Paper 8314.

Addis, W. (1998). *Structural Criticism and the Aesthetics of Structures*. Unpublished notes, Department of Construction Management and Engineering. Reading: University of Reading.

Addison, P. (1985). *Now the War is Over.* London: Jonathan Cape.

Ainley, P. (1993). *Class and Skill, Changing Divisions of Knowledge and Labour*. London: Cassell.

Ainslie, G. (1992). *Picoeconomics: The Strategic Interaction of Successive Motivational States within the Person.* Cambridge: Cambridge University Press.

Ajzen, I., and Fishbein, M. (1980). *Understanding attitudes and predicting social behavior.* Englewood Cliffs, N.J.: Prentice-Hall.

Allen, I., and Morris, J. (1998). Getting their act together. *The Architect's Journal*, 19 (207), 14 May, pp.33-36.

Allen, J., and Hamnett, C. (Eds.), (1991). *Housing and Labour Markets: Building the Connections*. London: Unwin Hyman.

Amerigo, M., and Aragones, J.I. (1997). A Theoretical and Methodological Approach to the Study of Residential Satisfaction. *Journal of Environmental Psychology*, 17, pp.47-57.

Amram. M., and Kulatilaka, N. (1999). *Real Options: Managing Strategic Investment in an Uncertain World*. Boston: Harvard Business School Press.

Anas, A., and Arnott, R.J. (1991). Dynamic housing market equilibrium with taste heterogeneity, idiosyncratic perfect foresight, and stock conversions. *Journal of Housing Economics,* 1(1), pp.2-32.

Andreae, S. (1996). From comprehensive development to conservation areas. In Hunter, M. (Ed.), *Preserving the Past: The Rise of Heritage in Modern Britain.* Stroud, Gloucestershire: Alan Sutton Publishing, pp.135-155.

Andrews, C. J. (2001). Analyzing quality-of-place. *Environment and Planning B: Planning and Design*, 28, pp.201-217.

Anthony, K.H. (1984). Moving Experiences: Memories of Favorite Homes. In Dverk, D., and Campbell D. (Eds.), *EDRA 15.*Proceedings of the 15th Annual Conference of the Environmental Design Research Association. Washington, D.C, pp.141-149.

Anson, B. (1981). *I'll fight you for it! Behind the Struggle for Covent Garden.* London: Jonathan Cape.

Arbuthnot, J. (1978). The roles of attitudinal and personality variables in the predication of environmental behavior and knowledge. In Craik, K.H, McKechnie, G.E. (Eds.), *Personality and the Environment*. Beverly Hills / London: Sage, pp.69-84.

Arias, E.G. (1993). User Group Preferences and their Intensity: In Arias, E.G. (Ed.), *The Meaning and Use of Housing, International perspectives, approaches and their applications.* Aldershot, U.K.: Avebury Publishing Limited, pp.169-199.

Ashworth, G. J. (1984). The Management of Change; Conservation Policy in Groningen, The Netherlands. *Cities*, 1 (6), Nov., pp.605-616.

Ashworth, G.J., and Voogd, H. (1990). *Selling the City: Marketing Approaches in Public Sector Urban Planning.* London: Belhaven Press.

Ashworth, G.J., and Larkham, P.J. (Eds.), (1994). *Building a New Heritage: Tourism, Culture and Identity in the New Europe.* London & New York: Routledge.

Assael, H. (1998). *Consumer Behavior and Marketing Action (6th edition)*. Cincinnati: South-Western College Publishing.

Auerbach, A. (1982). *The New Economics of Accelerated Depreciation*. Harvard Institute of Economic Research, Discussion Paper Series 883, Cambridge, Mass.

B

Bagozzi, R.P. (1982). A field investigation of causal relations among cognitions, affect, intentions, and behavior. *Journal of Marketing Research*, XIX, November, pp.562-584.

Baird, G., Gray, J., Isaacs, N., Kernohan, D., and McIndoe, G. (1996). *Building Evaluation Techniques*. New York: McGraw-Hill.

Baker, M.J. (1991). *Research for Marketing.* Basingstoke: Macmillan.

Balchin, P. (1998). An Overview of Pre-Thatcherite Housing Policy. In Balchin, P., and Rhoden, M. (Eds.), Housing: The Essential Foundations. London: Routledge, pp.25-49.

Balchin, P., Isaac, D., and Rhoden, M. (1998). Housing Policy and Finance. In Balchin, P., and Rhoden, M. (Eds.), Housing, The Essential Foundations. London: Routledge, pp.52-106.

Ball, M.J. (1973). *Recent empirical work on the determinants of relative house prices.* Urban Studies, 10, pp.213-233.

Baum A.E. (1988). Depreciation and Property Investment Appraisal. In MacLeary, A.R., and Nanthakumaran, N. (Eds.), *Property Investment Theory.* London: E.&F.N. Spon.

Baum, A..E. (1991). *Property Investment, Depreciation and Obsolescence.* London: .Routledge.

Beasley, E. (1994). Reviewing New Design in Historic Districts. In Scheer, B.C., and Preiser, W.F.E. (Eds.), *Design Review: Challenging Urban Aesthetic Control.* New York: Chapman and Hall, pp.20-30.

Beesley, K.B., and Russwurm, L..H. (1989). Social Indicators and Quality of Life Research: Towards Synthesis. *Environments,* 20 (1), pp.22-39.

Bechtel, R.B., and Korpela K..M. (1995). Most Happy and Most Depressing Places: A Finnish-U.S. Comparison. In Nasar, J.L., Grannis P., and Hanyu K. (Eds.), *EDRA 26 Conference 1995,* Oklahoma City, pp.80-86.

Belk. R.W. (1991). Situational variables and consumer behavior. In Ennis, B.M., Cox, K.K., and Mokwa, M.P. (Eds.). *Marketing Classics, eighth edition.* Upper Saddle River, N.J.: Prentice Hall International. Originally published in *Journal of Consumer Research,* (Dec. 1975), pp.157-164.

Bentham, J. (1789). *Principles of Morals and Legislation, Of the Principle of Utility.* Encarta 99 Encyclopedia. Seattle: Microsoft Corporation.

Berman, J.J. (Ed.), (1991). *Psychology and Aging: Nebraska Symposium on Motivation, 1991.* Lincoln, Nebraska: University of Nebraska Press.

Bernstein, P.L. (1998). *Against the Gods, The Remarkable Story of Risk*. New York: John Wiley & Sons, Inc.

Berry, J., McGreal, S., and Deddis, B. (Eds.), (1993). *Urban Regeneration: Property investment and Development*. London: E & FN Spon.

Berry, B.J.L. (1985). Islands of renewal in seas of decay. In Peterson, P.E. (Ed.), *The New Urban Reality.* Washington D.C.: The Brookings Institution, pp.69-96.

Best, M.H. (1990). *The New Competition - Institution of Industrial Restructuring*. Cambridge: Polity Press.

Best, M.H. (1999). *Cluster Dynamics in Theory and Practice; Singapore/Johor and Penang Electronics, Working Paper, 9/99,* Judge Institute, Cambridge.

Bianchi, M. (1998). *The Active Consumer: Novelty and Surprise in Consumer Choice.* London: Routledge.

Bloch, P.H. (1995). Seeking the Ideal Form: Product Design and Consumer Response. *Journal of Marketing*, July, pp.16-29.

Boleat, M. (1991). Tax Relief on Mortgage Interest. *Housing Finance,* (11), August, pp.17-19.

Bonnes, M., Secchiaroli, G. (1995). *Environmental Psychology: A Psycho-social Introduction.* London: Sage Publications.

Boon, J. (2001). *Can the Value of Design be Measured?* Paper presented at 'Value in Design' Conference, of The Design Research Society, 14-15 September, 2001.

Bourke, K., and Davis, H. (1997). *Factors Affecting Service Life Predications of Buildings, A Discussion Paper, Building Research Establishment Laboratory Report*. London: Construction Research Communications Limited.

Bowie, N. (1982). *Depreciation: Who Hoodwinked Whom?* Estates Gazette, 262, pp.405-411.

Brand, S. (1994). *How Buildings Learn: What Happens After They're Built.* New York: Viking.

Brealey, R.A., and Myers, S.C. (1996). *Principles of Corporate Finance* (Fifth Edition). New York: McGraw-Hill.

Brennan M., and Schwarz, E. (1985). Evaluating natural resource investments. *Journal of Business*, 58, pp.135-158

Brett, L. (1947). *The Things We See: Houses.* West Drayton, Middlesex: Penguin.

Bromwich, M. (1992). *Financial Reporting Information and Capital Market.* London: Pitman.

Brown, F.E., and Steadman, J.P. (1987). The Analysis and Interpretation of Small House Plans: Some Contemporary Examples. *Environment and Planning B,* 14 pp.407-438.

Brown S. (1994). Marketing and Postmodernism: Opportunity or Aporia? In Baker, M.J. (Ed.), *Perspectives in Marketing Management*. Chichester: Wiley, pp.73-96.

Brook, S. (1997). *Class.* London: Victor Gollancz.

Bryman, A., and Cramer, D. (1997). *Quantitative data analysis with SPSS for Windows: A guide for social scientists*. London: Routledge.

Buchanan, B., and Henderson, P.W. (1992). Assessing the Bias of Preference, Detection, and Identification Measures of Discrimination Ability in Product Design. *Marketing Science,* 11(1), pp.64-75.

Bull, J.W. (1993). *Life Cycle Costing of Construction*. London: Blackie Academic & Professional.

Bull, G. (1998). The Economics of Housing. In Balchin, P., and Rhoden, M. (Eds.), *Housing, The Essential Foundations.* London: Routledge, pp.25-49.

Burnett, J. (1986). *A Social History of Housing 1815-1985* (second edition). London: Routledge.

Burnkrant, R.E., and Page, T.J. (1982). An Examination of the Convergent, Discriminant, and Predictive Validity of Fishbein's Bahavioral Intention Model. *Journal of Marketing Research* Vol XIX, November, pp.550-561.

Buswell, R. J. (1984). Reconciling the Past with the Present, Conservation Policy in Newcastle-upon Tyne. *Cities,* 1(4), pp.500-514.

C

Cahill, D.J. (1994). A Two Stage Model of the Search Process for Single-Family Houses. *Environment and Behavior,* 26(1), pp.38-48.

Cambridge City Council. (1999). *Mill Road and St.Matthews Area Conservation Area Appraisal*. Cambridge: Cambridge City Council Planning Department.

Cambridgeshire County Council. (2001). *Review 2001,* (review of structure plan). Cambridgeshire County Council and Peterborough City Council.

Canter, D. (1974). *Psychology for Architects*. Barking, Essex: Applied Science Publishers Ltd.

Canter, D. (1984). Beyond building utilisation. In Powell J. A., Cooper, I., and Lera, S. (Eds.), *Designing for Building Utilisation.* London: E& F.N. Spon, pp.41-47.

Canter, D. (1993). Series Editor's Preface. In Arias, E.G., *The Meaning and Use of Housing, International perspectives, approaches and their applications.* Aldershot, U.K.: Avebury Publishing Limited, pp.xv - xvii.

Canter, D. (1987). Environmental Psychology in the United Kingdom. In Stokols, D., and Altman, I. (Eds.). *Handbook of Environmental Psychology.* New York: John Wiley and Sons, pp.1281-1310.

Carey, A. (1993). Depreciation: The Time for Change. London: The Research Board, The Institute of Chartered Accountants in England and Wales.

Chapman, D. (1955). *The Home and Social Status.* London: Routledge and Kegan Paul.

Cherry, G.E. (1970). *Town Planning in its Social Context.* London: Leonard Hill.

Chiriboga, D.A., and Cutler, L. (1980). Stress and Adaptation: Life Span Perspectives. In Poon L.W. (Ed.), *Aging in the 1980s.* Washington, D.C.: American Psychological Association Inc, pp.347-362.

Chuang, M.C., and Shiau, K.A. (1998). A study of style recognition and the operation of products in which Ming-style chairs are used as examples. *Environment and Planning 'B',* 26(6), pp.837-848

Churchill, G.A. (1999). *Marketing Research: Methodological Foundations (Seventh Edition).* Fort Worth: Dryden Press.

Clark, A., and Rivin, Z. (1977). *Homesteading in Urban U.S.A.* New York: Praeger Publishers.

Cooke, L. (1848). *Observations on Renting and Rating Railways, on the Depreciation of the Moving Stock, and the Mode of Computing the Tenant's Profit.* London: Simpkin, Marshall, & Co.

Cooper, C. (1976). The House as Symbol of the Self. In Proshansky, H.M., Ittelson, W.H., and Riulin L.G. (Eds.), *Environmental Psychology, People and Their Physical Settings,* 2nd Edition. New York: Holt, Reinhard & Winston, pp.435:448.

Copeland, T., and Antikarov V. (2001) *Real Options: A Practitioner's Guide*. New York: Texere.

Costello, J. (1991). House Prices and Earnings. *Housing Finance*, 11, August, pp.8-19.

Cowan, P., Fine, D., and Ireland J. (1969). *The Office, a facet of urban growth.* London: Heinemann Educational Books.

Cowan, P. (1965). Depreciation, Obsolescence and Aging. *Architects' Journal,* June 16, pp.1395-1401.

Cowan P. (1969). On Irreversibility. *Architectural Design,* 9/69, pp.485-486.

Cowburn, W. (1967) Housing in a Consumer Society. *Architectural Review,* November, pp.398-400.

Cramer, J.S. (1991). *The Logit Model for Economists*. London: Edward Arnold.

Cross, S., and Markus, H. (1991). Possible Selves Across the Life Span. *Human Development* (34), pp.230-255.

Cryer, J.D., and Miller, R.B. (1991). *Statistics for Business: Data Analysis and Modelling.* Boston: PWS-Kent Publishing.

Csikszentmihalyi, M., and Rochberg-Halton, E. (1981). *The Meaning of Things, Domestic Symbols of the Self*. Cambridge: Cambridge University Press.

Cullingworth, J.B. (1979). *Essays on Housing Policy.* London: George Allen & Unwin.

Cullingworth, J.B. (1992). Historic Preservation in the U.S. from landmarks to planning perspectives. *Planning Perspectives*, 7(1), pp.65-79.

D

Dalrymple, T. (1995). Do sties make pigs? *City Journal,* 5(3), (www.city-journal.org/html/5_3_a4).

Daunton, M.J. (1990). Rows and tenements: American Cities 1880-1914. In Daunton, M.J. (Ed.), *Housing the Workers: A comparative History, 1850-1914.* Leicester: Leicester University Press, pp.247-286.

Davis, Langdon and Everest. (1999). *Spons European Construction Costs Handbook*. London: E.& F.N. Spon.

Deaton, A. (1986). Demand Analysis. In Griliches, J., and Intriligator, M.D., *Handbook of Econometrics*, Vol.3. Amsterdam: Elsevier Science Publishers, pp.1767-1839.

Deemer, S. A., and Minke, K. M. (1999). An Investigation of the Factor Structure of the Teacher Efficacy Scale. *The Journal of Educational Research*, 93 (1), Sept./Oct. pp.3-10.

Dell'Isola, A., and Kirk, S. J. (1981). *Life Cycle Costing For Design Professionals.* New York: McGraw Hill.

Department of the Environment (1998). *Sustainable Development: Opportunities for Change*. London: Department of the Environment.

Department of the Environment, Transport and the Regions (1999) *Projections of Households in England to 2021.* London: Department of the Environment, Transport, and the Regions.

Derbes, Max, J. Jr. (1987). Economic Life Concepts. *The Appraisal Journal,* April, LV(2), pp.216-224.

Dix, G. (1985). Design and Conservation in the City. *Town Planning Review*, 56 (2), pp.127-134.

Donner, C. (2000). *Housing Policies in the European Union*. Vienna: Donner.

Duffy, H. (1995). *Competitive Cities: Succeeding in the Global Economy.* London: E&FN Spon.

E

Earl, P. (1986). *Lifestyle Economics: Consumer Behaviour in a Turbulent World.* Brighton: Wheatsheaf Books.

The Economist (1995a). The Dead Patches. 336(7926), Aug 5, p.28.

The Economist (1995b). *Pocket Britain in Figures.* London: Penguin.

The Economist (1998). Places to Linger. 348(8079) Aug 1, pp.63-64.

The Economist (2000). That was Beijing. 356(8187), Sept 9, pp.95-96.

The Economist (2001). Silicone Fen strains to grow. 359(8217), April 14, pp.27-28.

Elder, G.H. (1996). Human lives in changing societies: Life course and developmental insights. In Cairns, R.B., Elder, G.H.(jr), and Costello, E.J. (Eds.), *Developmental Science.* Cambridge: Cambridge University Press, pp.31-62.

Ellingham, I. (1995). Authorized Property Unit Trusts and the Canadian Experience. *The Journal of Property Finance,* 6(1), pp.28-37.

Ellingham, I. (1996). Building Aging, Design and the Use of Resources. *Ontario Eco-Architecture 2*, Toronto: Ontario Association of Architects.

English, J. Madigan, R. and Norman, P. (1976). *Slum Clearance, The Social and Administrative Context in England and Wales*. London: Croom Helm.

Ermisch J.F., Findlay, J., and Gibb, K. (1996) The price elasticity of housing demand in Britain: Issues of sample selection. *Journal of Housing Economics,* 5, pp.64-86.

Erskine, R. (1984). Designing Between Client and Users. In Hatch, C.Richard (Eds.), *The Scope of Social Architecture*. New York: Van Nostrand Reinhold, pp.186-193.

Escher, L. (1981). *A Broken Wave, The Rebuilding of Britain, 1940-1980.* London: Allen Lane.

Espe, H. (1981). Differences in the Perception of National Socialist and Classicist Architecture. *Journal of Environmental Psychology*, (1), pp.33-42.

Etobicoke, Borough of. (1982). *Project Schoolhouse.* Toronto: Borough of Etobicoke.

F

Farshchi, M.A. (1999). *A Clients' Project Definition Tool.* Reading: The University of Reading.

Faucheux, S., Pearce, D., and Proops, J. (1996). *Models of Sustainable Development*. Cheltenham: Edward Elgar.

Fawcett, W. (1994). *The Appearance of Office Buildings, Preferences of building users and building professionals*. Cambridge: Cambridge Architectural Research.

Fawcett, W. (1995). Architecture: Functional Approach or the Case for User Research. *Architectural Research Quarterly*, 8(1), pp.8-15.

Fawcett W., and Ellingham, I. (2001). Options-Based Evaluation of Facade Refurbishment Alternatives. In conference proceedings, *'Whole Life Costing of Facades',* Centre for Window and Cladding Technology. Bath: University of Bath.

Fazio, R.H. (1986). How do attitudes guide behavior? In Sorrentino, R.M., and Higgins E.T. (Eds.), *Handbook of Motivation and Cognition.* Chichester: John Wiley and Sons, pp.204-243.

Feilden, B.M. (1985). Architectural and Urban Conservation, a review of the state of the art. *Town Planning Review* 56(2), pp.197-221.

Fiske, S.T., and Pavelchak, M.A. (1986). Category-based versus Piecemeal-based affective responses. In Sorrentino, R.M., and Higgins E.T., Handbook of Motivation and Cognition. Chichester: John Wiley and Sons, pp.167-203.

Flanagan, R., Norman, G., Meadows, J., and Robinson, G. (1989). *Life Cycle Costing.* Oxford: BSP Professional Books.

Fletcher, C. (1976). The relevance of domestic property to sociological understanding. *Sociology,* 10 (3), pp.450-468.

Ford, B. (1989). *Victorian Britain.* Cambridge: Cambridge University Press.

France, J.C. (1959). Age and Ownership of Britain's Housing Stock. *Estates Gazette*, 7 February, p.224.

Franck, K.A. (1984) Exercising the ghost of physical determinism. *Environment and Behavior*, 16, pp.411-435.

G

Galbraith, J.K. (1958). *The Affluent Society.* Harmondsworth, Middlesex: Penguin Books.

Galbraith, J.K. (1964). *The Scotch.* Boston: Riverside Press.

Gallion E.B., and Eisner S. (1963). *The Urban Pattern* (first edition). Princeton N.J.: Van Nostrand.

Gardner, N. (1998). High Rise Home Loans Blocked. *The Times,* May 24, pg 4-1.

Garner, R., and Kelly, R. (1998). *British Political Parties Today* (second edition). Manchester: Manchester University Press.

Gibson, M.S., and Langstaff, M.J. (1982). *An Introduction to Urban Renewal.* London: Hutchinson Publishing.

Giuliani, V., Bonnes, M., Amoni, F., and Bernard, Y. (1988). Home and the theory of place. In Canter, D.; Krampen, M., and Stea, D. (Eds.), *Environmental Perspectives*. Aldershot: Gower Publishing Company, pp.39-53.

Glautier, M.W.E., and Underdown, B. (1994). *Accounting Practice (4th edition).* London: Pitman Publishing.

Goldthorpe, J.H., Dockwood, D., Bechhofer, F. and Platt, J. (1969). *The Affluent Worker in the Class Structure.* Cambridge: Cambridge University Press.

Goodchild, B. (1974). Class differences in environmental perception: an exploratory study. *Urban Studies,* 11, pp.157-169.

Goodman, A.C., and Thibodeau, T.G. (1995). Age-related heteroskadasticity in hedonic house price equations. *Journal of Housing Research,* 6(1), pp.25-42.

Goulding, C. (1999). Contemporary museum culture and consumer behaviour. *Journal of Marketing Management*, 15, pp.647-671.

Granger, C.W.J. (1980). *Forecasting in Business and Economics.* New York: Academic Press.

Green, R. (1999). Meaning and form in community perception of town character. *Journal of Environmental Psychology,* 19, pp.311-329.

H

Habe, R. (1989). Public Design Control in American Communities. *Town Planning Review* 60 (2), pp.195-219.

Hackney, R. (1988). *The Good, The Bad and the Ugly*. London: Frederick Muller.

Hall, A.C. (1996). *Design Control, Towards a New Approach*. Oxford: Butterworth.

Hall, D. (1999). Semi-conscious. *Telegraph Magazine,* 12 June, p.18.

Hall, P. (1963). *London 2000*. London: Faber and Faber.

Harrigan, K.R., and Porter, M.E. (1985). End-game strategies for declining industries. In Kantrow, A.M. (Ed.), *Sunrise... Sunset: Challenging the Myth of Industrial Obsolescence*. New York: John Wiley & Sons, Harvard Business Review Executive Book Series, pp.280-294.

Hawkes, D., Owers, J., Rickaby, P., and Steadman, P. (1987). *Energy and Urban Built Form.* London: Butterworths.

Hershberger, R.G. (1970). A study of meaning and architecture. Sanoff H., and Cohen, S. (Eds.), *Proceedings of the 1st EDRA Conference,* Raleigh, N.C., pp.86-100. Reprinted in Nasar, J.L. (Ed.), (1988). *Environmental aesthetics, Theory, research and applications.* Cambridge: Cambridge University Press.

Hershberger, R.G., and Cass, R.C. (1988). Predicting user responses to buildings. In Nasar, J.L. (Ed.), (1988), *Environmental aesthetics, Theory, research and applications.* Cambridge: Cambridge University Press, pp.195-211.

Hilberseimer, L. (1955) *The Nature of Cities.* Chicago: Paul Theobald and Company.

Hodder J.E., and Riggs, H.E. (1994). Pitfalls in Evaluating Risky Projects. In Clark, K.B., and Wheelwright,

S.C., (Eds.), (1994), *The Product Development Challenge.* Boston: Harvard Business Review Books, pp.170-182.

Hogarth, R.M., and Reder, M.W. (1986). *Rational Choice, The Contrast between Economics and Psychology*. Chicago: University of Chicago Press.

Holbrook, M.B., and Hirschman, E.C. (1991). The Experiential Aspects of Consumption: Consumer Fantasies, Feelings, and Fun. In Ennis, B.M., Cox, K.K., and Mokwa, M.P. (Eds.), *Marketing Classics, eighth edition,* Upper Saddle River, N.J: Prentice Hall International. Originally published in *Journal of Consumer Research,* 9 (Sept. 1982), pp.179-191.

Hole, W.V., and Attenburrow, J.J. (1966). *Houses and People, A review of user studies at the Building Research Station*. London: HMSO.

Holister, D. (1990?). *Land, Environment, and Structural Change*. Unpublished notes on urban conservation. Clare College: Cambridge.

Hooper, A., and Nichol, C. (1999). The design and planning of residential development: standard house types in the speculative housebuilding industry. *Environment and Planning 'B'; Planning and Design*, 26, pp.793-805.

Hope, S. (1999). *Applied Microeconomics.* Chichester: John Wiley and Sons.

Ministry of Housing and Local Government. (1969). *Circular 65/69*. London: HMSO.

Howard, J.A., and Sheth, J.N. (1991). A Theory of Buyer Behavior. In Enis, B.M., Cox, K.K., and Mokwa, M.P., *Marketing Classics eighth edition.* Upper Saddle River, N.J.: Prentice Hall International. Reprinted from Proceedings of the 1967 Winter Conference of the American Marketing Association, pp.137-155.

Hutcheson, G.D., and Montinho, L. (1998). Measuring Preferred Store Satisfaction Using Consumer Choice Criteria as a Mediating Factor. *Journal of Marketing Management*, 14, pp.705-720.

I

Iselin, D.G., and Lemer, A. C. (1993). *The Fourth Dimension in Building: Strategies for Minimizing Obsolescence, (Committee on Facility Design to Minimize Premature Obsolescence, Building Research Board,* Commission on Engineering and Technical Systems, National Research Council). Washington D.C.: National Academy Press.

J

Jackson, T., and Marks, N. (1999). Consumption, sustainable welfare and human needs - with reference to U.K. expenditure patterns between 1954 and 1994. *Ecological Economics,* 28, pp.421-441.

Jacobs, J. (1962). *The Death and Life of Great American Cities*. London: Peregrine in association with Jonathan Cape, (1984 edition).

Jebb, E. (1906). *Cambridge, A brief study on social questions*. Cambridge: Macmillan & Bowes.

Jobber, D. (1998). *Principles and practice of Marketing,* 2nd edition. London: McGraw-Hill.

Johnson, K.W., Lenau, T., and Ashby, M. (2000). *The Perceived Attributes of Products*, Unpublished discussion paper of the Engineering Design Centre, University of Cambridge.

Johnstone, I.M. (1998). The Optimum Timing and Maximum Impact of Full Rehabilitation of New Zealand Housing Stock. *Environment and Planning A,* 30, pp.1295-1311.

Joynt, P., and Warner, M. (1996). *Managing Across Cultures.* London: International Thomson Business Press.

K

Kachelmeier, S.J., and Granof, M.J. (1993). Depreciation and Capital Investment Decisions: Experimental Evidence in a Government Setting. *Journal of Accounting and Public Policy,* 12(4), pp.291-323.

Kain, J.F., and Quigley, J.M. (1970). Measuring the value of housing quality. *Journal of the American Statistical Association.* 65(330). Reprinted in Quigley John M. (Ed.), (1997), The Economics of Housing, Vol.1. Cheltenham: Edward Elgar Publishing Limited, pp.423-439.

Kamenetzky, M. (1992). The Economics of the Satisfaction of Needs. In Ekins, P., and Max-Neef, M. (Eds.), *Real Life Economics*. London: Routledge, pp.181-196.

Kantrow, A.M. (Ed.). (1985). *Sunrise... Sunset: Challenging the Myth of Industrial Obsolescence.* New York: John Wiley & Sons, Harvard Business Review Executive Book Series.

Kaplan. R., and Kaplan, S. (1989). *The Experience of Nature.* Cambridge: Cambridge University Press.

Kaplan, S. (1992). Environmental Preference in a Knowledge-Seeking, Knowledge-Using Organism. In Barkow, J.H., Cosmides, L., and Tooby, J. (Eds.), *The Adapted Mind.* Oxford University Press: Oxford, pp.582- 598.

Kelly, R. (1998). Old Buildings are Buzzing. *The Times*, London, 5 Aug, 1998: p.31.

Keynes, F.A. (1947). *By-Ways of Cambridge History.* Cambridge: Cambridge University Press.

Keynes, J.M. (1931). Essays in Persuasion 'Economic Possibilities for Our Grandchildren'. London: Macmillan.

Keynes, J.M. (1973). *The Collected Writings of John Manyard Keynes, Vol VII, The General Theory of Employment Interest and Money.* Cambridge; Cambridge University Press. (General Theory originally published in 1936).

Kingston University, Damond Lock Grabowski, King Sturge: (2001). Buildings: A New Life: A report for the Department of Trade and Industry. Kingston-upon-Thames: Kingston University.

L

Laaksonen, P. (1994). *Consumer involvement: Concepts and research.* London: Routledge.

Laibson, D.I. (1996). *Hyperbolic discount functions, undersaving and savings policy.* Cambridge, Mass.: National Bureau of Economics Research.

Lamden, C.W., Gerboth, D.L., and McRae, T.W. (1975). *Accounting for Depreciable Assets.* New York: The American Institute of Certified Public Accountants.

Lancaster, K. (1971). *Consumer Demand: A New Approach*. New York: Columbia University Press.

Lang, J. (1988). Understanding Normative Theories of Architecture: The Potential Role of the Behavioral Sciences. *Environment and Behavior*, 20(5), pp.601-632.

LeCorbusier (1987). *The City of Tomorrow.* Translated from the 8th French edition of *Urbanisme* (1924) by Etchells, F. London: The Architectural Press.

Ledgerwood, G. (1985). *Urban Innovation: The Transformation of London's Dockyards*, 1968-84. Aldershot: Gower.

Lehmann, D.R., Gupta, S., and Steckel, J.H. (1998). *Marketing Research*. Reading, Mass.: Addison-Wesley.

Levinthal, D.A., and Purohit, D. (1989). Durable Goods and Product Obsolescence. *Marketing Science*, 8(1), pp.35-56.

Lichfield, N. (1988). *Economics in Urban Conservation*. Cambridge: Cambridge University Press.

Light, D., and Prentice, R.C. (1994). Who Consumes the Heritage Product? Implications for European Heritage Tourism. In Ashworth, G.J., and Larkham P.J. (Eds.), *Building a New Heritage: Tourism, Culture and Identity in the New Europe.* London and New York: Routledge, pp.90-116.

Littlefield, D., and Booth, R. (2001). *Jowell attacks heritage.* Building Design, Issue 1513, December 7, p.3.

Llewelyn-Davies, Lord (1969). Foreword. In Cowan, P., Cowan, P., Fine, D.,and Ireland J., *The Office, a facet of urban growth*. London: Heinemann Educational Books.

Lonberg-Holm, K. (1933). Time Zoning as a Preventive of Blighted Areas. *Architectural Record,* November, pp.340-341.

Lowry I.S. (1960). Filtering and housing standards: A Conceptual Analysis. *Land Economics*, XXXVI (4). November, pp.362-370.

Lutz, M.A. (1999). Humanistic Perspective. In Earl, P.E, Kemp, S. (Eds.), *The Elgar Companion to Consumer Research and Economic Psychology*. Cheltenham: Edward Elgar, pp.314 - 319.

M

Macdonald, K., and Ridge, J. (1988). Social Mobility. In Halsey, A.H. (Ed.), *British Social Trends since 1900*. Basingstoke: Macmillan Press, pp.202-225.

MacLennan, D. (1977). Some Thoughts on the Nature and Purpose of House Price Studies. *Urban Studies*, 14, pp.59-71.

Malpezzi, S., Oxanne, L., and Thibodeau, T.G. (1987). Microeconomic Estimates of Housing Depreciation. *Land Economics*, 63 (4), November pp.372-385.

Mann, T. (1997). Notes on the Value of Buildings, *EDRA 28, 'Space, Design & Management for Place Making'* Proceedings of the 28th Annual Conference of the Environmental Design Research Association, Montreal, pp.31-38.

Marsden, D., and Littler, D. (1998). Positioning Alternative Perspectives of Consumer Behaviour. *Journal of Marketing Management*, 14, pp.3-38.

Marshall, A. (1891). Principles of Economics 2nd Edition. London: Macmillan.

Maslow, A.G. (1970). *Motivation and Personality*. New York: Harper and Row.

Mason, C., and Quigley, J.M. (1990). Comparing the Performance of Discrete Choice and Hedonic Models. In Quigley, J. M. (Ed.), (1997), *The Economics of Housing, Volume I.* Cheltenham: Edward Elgar Publishing Limited, pp.567-603.

Matthews, K. (1999). Familiarity and Contempt: The archaeology of the 'modern'. In Tarlow, S., and West, S. (Eds.), *The Familiar Past? Archaeologies of later historical Britain*. London: Routledge, pp.155-179.

McClarence, S. (1998). On the ill-defined trail of Moore. *The Times Weekend.* November 14, 1998, p.31.

McFadden, D. (1978). Modelling the Choice of Residential Location. Reprinted In Quigley, J.M. (Ed.), (1997), *The Economics of Housing Volume I*. Cheltenham: Edward Elgar, pp.531-552.

McFadden, D. (1986). The Choice Theory Approach to Market Research. *Marketing Science*, 5 (4). Fall 1986, pp.275-297.

McGoldrick, P.J., and Pieros, C.P. (1998). Atmospherics, Pleasure And Arousal: The Influence of Response Moderators. *Journal of Marketing Management,* 14, pp.173-197.

McKie, R. (1969). *The Concept of Function in Urban Housing Renewal: A Study of the Problems of Renewal in Victorian Housing Neighbourhoods in Provincial Towns*. Unpublished Ph.D., University of Cambridge.

McKie, R. (1971). *Housing and the Whitehall Bulldozer.* London: The Institute of Economic Affairs.

McWilliam, G., and Dumas, A. (1997). Using Metaphors in New Brand Design. *Journal of Marketing Management*, 13, pp.265-284.

Medhurst, D.F., and Lewis, J.P. (1969). *Urban Decay.* London: Macmillan.

Meij, J.L. (1961). *Depreciation and Replacement Policy.* Amsterdam: North-Holland Publishing.

Merrett, S., and Gray, F. (1982). *Owner-Occupation in Britain.* London: Routledge & Kegan Paul.

Mills, R.W. (1998). *The Dynamics of Shareholder Value*. Lechlade, Glos.: Mars.

Ministry of Housing and Local Government (1969). *Circular 65/69*. London: HMSO.

Mitchell, B.R. (1962). *Abstract of British Historical Statistics*. Cambridge: Cambridge University Press.

Mook, D.A. (1987). *Motivation: The Organization of Action.* New York: W.W.Norton.

Mumford, L. (1938). *The Culture of Cities.* London: Secker & Warburg.

Mumford, L. (1956). *The Urban Prospect.* New York: Harcourt, Brace and World.

Mynors, C. (1999). *Listed Buildings, Conservation Areas and Monuments, 3rd edition*. London: Sweet and Maxwell.

N

Nasar, J.L. (Ed.), (1988). *Environmental aesthetics, Theory, research and applications.* Cambridge: Cambridge University Press.

Nasar, J.L. (1989). Symbolic Meanings of House Styles. *Environment and Behavior,* 21(3), pp.235-257.

Nasar, J.L. (1994). Urban Design Aesthetics: The Evaluation of Building Exteriors. *Environment and Behavior,* 26(3), pp.377-401.

Nasar, J.L. (1999). *Design by Competition, Making Design Competition Work.* Cambridge: Cambridge University Press.

Needleman, L. (1960). The demand for domestic appliances. *National Institute Economic Review* (12), November, pp.24-44.

Needleman, L. (1965). *The Economics of Housing.* London: Staples Press.

Needleman, L. (1967). *Comparative Economics of Improvement and New Building.* Paper presented at 'Conference on the Improvement of Old Houses and Their Environment'. Cambridge, June 1967.

Nelson, P. (1999). Multiattribute utility models. In Earl, P.E., and Kemp, S. (Eds.), *The Elgar Companion to Consumer Research and Economic Psychology*. Cheltenham, UK: Edward Elgar, pp.392-400.

Nicoletti, M. (1968). Obsolescence. *Architectural Review*, 143, pp.413-415.

Niit, T. (1993). Housing Characteristics, Family Relations and Lifestyle. In Arias, E.G. (Ed.), *The Meaning and Use of Housing.* Aldershot, U.K.: Avebury, pp.327-340.

Norton, B., Costanza, R., and Bishop, R.C. (1998). The Evolution of preferences: Why 'sovereign' preferences may not lead to sustainable policies and what to do about it. *Ecological Economics,* 24, pp.193-211.

Norusis, M.J. (1990). *SPSS Base System User's Guide.* Chicago: SPSS Inc.

Nutt, B., Walker B., Holliday, S., and Sears, D. (1976). *Obsolescence in Housing: Theory and Applications*. Farnborough: Saxon House Studies.

O

O'Drisoll, A., and Murray, J.A. (1998). The changing nature of theory and practice in marketing: in the value of synchrony. *Journal of Marketing Management*, 14, pp.391-416.

Oliver, P., Davis, I., and Bentley, I. (1981). *Dunroamin: The Suburban Semi and its Enemies.* London: Pimlico/Random House.

Ore, M. (2001). From sunny LA to grimy Harlesden. *The Sunday Times,* 16 September, 2001, p.31.

Orians, G.H., and Heerwagen, J.H. (1992). Evolved Responses to Landscapes: In Barkow, J.H., Cosmides, L., and Tooby, J. (Eds.), *The Adapted Mind.* Oxford: Oxford University Press, pp.555-579.

Osgood, C.E. Suci, G.J., and Tannenbaum P.H. (1957). *The Measurement of Meaning.* Urbana: University of Illinois Press.

Osgood, C.E., May, W.H., and Miron, M.S. (1975). *Cross-cultural Universals of Affective Meaning*. Urbana: University of Illinois Press.

Osgood, C.E., and Tzeng, O.C.S. (1990). *Language, Meaning, and Culture, The Selected Papers of C.E.Osgood*. New York: Praeger.

P

Packard, V. (1959). *The Status Seekers.* Harmondsworth: Penguin Books.

Pannel, B. (1997). Affordability. *Housing Finance* (35), August, pp.10-17.

Parker, J., and Mirrlees, C. (1988). Housing. In Halsey, A.H. (Ed.), *British Social Trends since 1900*. Basingstoke: Macmillan Press, pp.357-397.

Parr, J. (1980). The Interaction of Persons and Living Environments. In Poon L.W. (Ed.), *Aging in the 1980s*. Washington D.C.: American Psychological Association Inc, pp.393-406.

Payne, S. (1984). *Down Your Street: Cambridge Past and Present.* Cambridge: Pevensey Press.

Pearce, D. (1993). *Measuring Sustainable Development, Blueprint 3.* London: Earthscan Publications Ltd.

Pennartz, P.J.J. (1986). Atmosphere at home: A qualitative approach. *Journal of Environmental Psychology,* 6, pp.135-153.

Pervin, L.A. (1996). *The Science of Personality.* New York: John Wiley and Sons.

Peters, H.P., Albrecht, J., Hennen, I. and Stegelmann, H.U. (1990). Chernobyl and the Nuclear Power Issue in West German Public Opinion. *Journal of Environmental Psychology,* 10, pp.121-134.

Peterson, G.L., Bishop, R.L., and Neumann, E.S. (1970). The quality of visual residential environments. In Sanoff H., Cohen, S. (Eds.), *1st EDRA Conference,* Raleigh, N.C., pp.101-114.

Philip, D. (1996). The Practical Failure of Architectural Psychology. *Journal of Environmental Psychology*, 16, pp.277-284.

Plan Local / Chesterton Consulting (1992). *The Character of Conservation Areas.* Royal Town Planning Institute, Milton Keynes / University of Birmingham.

Pol, E. (1993). *Environmental Psychology in Europe.* Aldershot: Avebury Publishing.

Porteous, J.D. (1977). *Environment and Behavior: planning and everyday urban life*. Reading, Mass.: Addison- Wesley.

Powell, C. (1996). *The Building Industry since 1800: (Second Edition).* London: E & FN Spon.

Pratt, M.W., and Norris, J.E. (1994). *The Social Psychology of Aging.* Oxford: Blackwell.

Price, C. (1993). *Time, Discounting and Value.* Oxford: Blackwell.

Proshansky, H.M., Fabian, A.K., and Kaminoff, R. (1983). Place-Identity: Physical World Socialization of the Self. *Journal of Environmental Psychology*, 3, pp.57-83.

Purcell, A.T. (1984a). The Organisation of the Experience of the Built Environment. *Environment and Planning B: Planning and Design*, 11 pp.173-192.

Purcell, A.T. (1984b). Multivariate Models and the Attributes of the Experience of the Built Environment. *Environment and Planning B: Planning and Design*, 11, pp.193-212.

Q

Quelch, J.A. (1989). *How to Market to Consumers.* New York: John Wiley & Sons.

Quigley, J.M. (1987). Consumer Choice of Dwelling, Neighborhood and Public Services. *Regional Science and Urban Economics*, 15 (1), pp.41-63.

R

Randlesome, C., Brierley, W., Bruton, K., Gordon, C., and King, P. (1997). *Business Cultures in Europe (2nd Edition).* London: Butterworth Heinemann.

Rapoport, A. (1969). *House Form and Culture.* Englewoods Cliffs, N.J.: Prentice-Hall.

Rapoport, A. (1990). *History and Precedent in Environmental Design.* New York: Plenum Press.

Ratcliff, R.U. (1949). *Urban Land Economics*. New York: McGraw Hill.

Ratcliff, R.U. (1961). *Real Estate Analysis.* New York: McGraw-Hill.

Rattray, C. (1990). Stopping the steamroller. *AJ,* 20 May 1990, pp.30-31.

Ravetz, A. (1995). *The Place of Home, English Domestic Environments 1914-2000.* London: E & F.N. Spon.

Reschovsky, J.D. (1992). An empirical investigation into homeowner demand for home upkeep and improvement. *Journal of Real Estate Finance and Economics*, 5; pp.55-71.

Reynolds, M. (1980). *Cambridge Housing and National Policy*. Department of Architecture, University of Cambridge, Unpublished paper.

Richardson, V. (1997). Wasting Condition. *RIBA Journal*, December p.60-63.

Roberts, H.C. (1933). Alteration of Old School Properties. *Architectural Record,* February, pp.111-117.

Robson, C. (1993). *Real World Research.* Oxford: Blackwell.

Ronalds, T. (1973). *What Could Mr.Allardyce Have Done?* Department of Architecture, University of Cambridge, Unpublished paper.

Ropke, I. (1999). The Dynamics of Willingness to Consume. *Ecological Economics* 28, pp.399-420.

Rose, D. (1995). Official Social Classifications in the U.K.. *Social Research Update,* Issue 9. Guildford: University of Surrey. (www.soc.surrey.ac.uk/sru/SRU9.html).

Rosenhead, J., Elton, M., and Gupta, S.K. (1972). Robustness and Optimality as Criteria for Strategic Decisions. *Operational Research Quarterly,* 23(4), pp.413-431.

Royal Institution of Chartered Surveyors. (1997). *Calculation of Worth.* Investment Property Forum. London: RICS Business Services Limited.

Ruskin, J. (1985). The Stones of Venice. In Wilmer, C. (Ed.), In *Unto This Last and Other Writings.* Harmondsworth: Penguin.

S

Saari, A. (1998). *The Viability of Rehabilitated Apartment Buildings.* Helsinki: Espoo.

Sadalla, E.K., and Sheets V.L. (1993). Symbolism in Building Materials; Self Representative and Cognitive Components. *Environment And Behavior*, 25(2), pp.155-180.

Saegert, S. (1987). Environmental Psychology and Social Change. In Stokols, D., Altman, I. (Eds.), *Handbook of Environmental Psychology.* New York: John Wiley and Sons, pp.99-128.

Salway, F. (1986). *Depreciation of Commercial Property*. Reading : College of Estate Management.

Samuelson, P.A., and Nordhaus, W.D. (1992). *Economics, 14th edition.* New York: McGraw-Hill.

Sanoff, H. (1970). House Form and Preference. In Archer, J., Eastman C. (Eds.), *EDRA 2*. Pittsburgh, pp.334-339.

Schaie, K.W., and Willis, S.L. (1996). *Adult Development and Aging (4th edition).* New York.: Harper Collins.

Schorr, A.L. (1963). *Slums and Social Insecurity.* Washington D.C.: U.S. Department of Health, Education, and Welfare.

Schultz, D.P, and Schultz, S.E. (2000). *A History of Modern Psychology.* Fort Worth: Harcourt, Brace.

Scitovsky, T. (1992). *The Joyless Economy: The Psychology of Human Satisfaction*. Oxford: Oxford University Press.

Seeley, I.H. (1996). *Building Economics (4th Edition*). Basingstoke: Macmillan Press.

Seward, J.A., Delaney, C.J., Smith, M.T. (1992) An empirical analysis of housing price appreciation in a market stratified by size and value of the housing stock. *Journal of Real Estate Research,* 7(2), pp.195--205.

Shafir, E., Simonson, I., and Tversky, A. (1993). Reason Based Choice. *Cognition*, (49), pp.11-36.

Sharma, S. (1996). *Applied Multivariate Techniques*. New York: John Wiley & Sons.

Shilling, J.D., Sirmans, C.F., and Dombrow, J.F. (1991). Measuring depreciation in single-family rental and owner-occupied housing. *Journal of Housing Economics*, 1(2), pp.368-383.

Sigsworth, E.M., and Wilkinson, R.K. (1967). Rebuildings or renovation? *Urban Studies,* 4(2), pp.109-121.

Sime J. (1993). What makes a house a home: the garden? In Bulos, M., Teymur, N. (Eds.): *Housing: Design, Research, Education*. Aldershot: Avebury, pp.239- 254.

Sing, T.F. (1998). *Real Options in Real Estate: Irreversibility, Volatility and Option Premia in UK Commercial Property Market.* Unpublished Ph.D. Thesis, University of Cambridge.

Singh, N. (1996). *The Keynesian Fallout.* New Delhi: Sage Publications.

Slovic, P. (1975). Choice Between Equally Valued Alternatives. *Journal of Experimental Psychology: Human Perceptions and Performance*, (1), pp.280-287

Slovic, P. (1995). The Construction of Preference. *American Psychologist,* 50(5), pp.364-371.

Smith, M.P. (2001). *Transnational Urbanism.* Malden, Mass: Blackwell Publishers.

Smith, T. (1992). *Accounting for Growth.* London: Century Business.

Soo, L.M. (1998). *Wren's "Tracts" on Architecture and Other Writings.* Cambridge: Cambridge University Press.

Spons European Construction Costs Handbook. (1999). Davis, Langdon & Everest (Eds.). London: E.& F.N. Spon.

Stamps, A.E. III. (1993). Simulation Effects on Environmental Preference. *Journal of Environmental Management*, 38, pp.115-132.

Stamps, A.E. III. (1998). Measures of architectural mass: from vague impressions to definite design features. *Environment and Planning 'B'*, 25 (6), pp.825-836.

Stamps A.E. III. (1999). Demographic Effects in Environmental Aesthetics: A Meta-Analysis. *Journal of Planning Literature*, 14(2), pp.155-175.

Stamps, A.E. III, and Nasar, J.L. (1997). Design Review and Public Preferences: Effects of Geographical Location, Public Consensus, Sensation Seeking, and Architectural Styles. *Journal of Environmental Psychology*, 17, pp.11-32.

Statt, D.A. (1997). *Understanding the Consumer: A Psychological Approach.* Basingstoke: MacMillan Press.

Steinberg, F. (1996). Conservation and Rehabilitation of Urban Heritage in Developing Countries. *Habitat International,* 20(3), pp.463-475.

Stone P.A. (1967). National Resources. *Architectural Review,* November, pp.360-362.

Stone, P.A. (1983). *Building Economy (Third Edition)*. Oxford: Pergamon International.

Department of the Environment. (1998) *Sustainable Development: Opportunities for Change*. London: Department of the Environment.

Switzer, J.F.Q. (1963). The Life of Buildings in an Expanding Economy. *Chartered Surveyor,* August, pp.70-77

Switzer, J.F.Q. (1968). *The Economics of Central Area Redevelopment: The Life of Building*s. Paper given at the Institute for Advanced Architectural Studies, University of York.

Switzer, J.F.Q. (1970). The Urban Renewal Process. *Conference on Private Enterprise in Urban Renewal.* Cambridge, 10 April 1970.

T

Tanur, J.M. (1985). Survey Research Methods in Environmental Psychology. In Baum, A., Singer, J.E. (Eds.), *Advances in Environmental Psychology*, Volume.5, Hillsdale, N.J.: Lawrence Erlbaum Associates, pp.147-184.

Tarn, J.N. (1985). Urban Regeneration: The Conservation Dimension. *Town Planning Review*, 56 (2), pp.245-268.

Tarlow, S. (1999). Strangely Familiar. In Tarlow, S., West, S. (Eds.), *The Familiar Past? Archaeologies of later historical Britain*. London: Routledge, pp.263-272.

Tate J.C., and Moreton, C.G.N. (1979). Short-life Dwellings: A rational approach to their management. *Housing Review*, July-August, pp.116- 119.

Taylor, N. (1973). *The Village in The City.* London: Temple Smith.

Telling, A.E., and Duxbury, R.M.C. (1993). *Planning Law and Procedure*. London: Butterworths.

Thomas, A.D. (1983). Planning in Residential Conservation Areas. *Progress in Planning*, 20(3), pp.173-255.

Thomas, A.D. (1986). *Housing and Urban Renewal: Residential Decay and Revitalization in the Private Sector.* London: George Allen & Unwin.

Thompson, F.M.L. (1988). *The Rise of Respectable Society: A social History of Victorian Britain*, *1830-1900.* London: Fontana Press.

Thompson, M. (1979). *Rubbish Theory: The creation and destruction of value.* Oxford: Oxford University Press.

Thompson, M. (1984). Mole versus Corb: An Anthropologist's Meta View of Designing for Building Utilisation. In Powell J.A., Cooper, I., and Lera, S. (Eds.), *Designing for Building Utilisation.* London: E& F.N. Spon, pp.9-16.

Thrift, N. (1987). Introduction: The geography of late twentieth-century class formation. In Thrift, N., and Williams, P. (Eds.), *Class and Space: The making of urban society*. London: Routledge & Kegan Paul, pp.207-253.

Tobey, H.N. (1992). Connotative messages of single-family homes: A multidimensional scaling analysis. In Bart. P., Chen, A., and Francescato G. (Eds.), *EDRA 13,* College Park, Maryland, pp.449-463.

Toman, M.A. (1999). Sustainable Decision-Making: The State of The Art from an Economics Perspective. In O'Connor, M., Spash, C.L. (Eds.), *Valuation and the Environment*. Cheltenham: Edward Elgar, pp.59-72.

Tong, Z.Y.,and Glascock, J.L. (2000). Price dynamics of owner-occupied housing in the Baltimore-Washington Area: Does Structure Type Matter? *Journal of Housing Research,* 11(1), pp.29-66.

Treasury. (1947) *White Paper: Capital Investment in 1948.* London: HMSO.

Trompenaars, F.,and Hampden-Turner, C. (1993). *Riding the Waves of Culture: Understanding Cultural Diversity in Business*. London: The Economist Books.

Tse, R.Y.C.,and Raftery, J. (1999). Income elasticity of housing consumption in Hong Kong: a cointegration approach. *Journal of Property Research,* 16 (2), pp.123-138.

Tversky, A., Sattath, S., and Slovic, P. (1988). Contingent Weight in Judgement and Choice. *Psychological Review,* (95), pp.371-384.

U

University of Reading and DTZ Debenham Thorpe. (1998) *Right Space: Right Price? Using asset pricing models to value property interests*. London: Royal Institute of Chartered Surveyors.

Usunier, J-C. (2000). *Marketing Across Cultures*, 3rd Edition. Harlow: Prentice Hall.

Uzzell, D.L. (Ed.). (1989). *Heritage Interpretation Volume 1: The Nature and Built Environment.* London: Belhaven Press.

V

Van den Bergh, L., and Ferrer-i-Caronell, A. (2000). Economic theories of sustainable consumption. In Heap, B., and Kent, J. (Eds.), *Towards sustainable consumption: A European perspective*. London: The Royal Society, pp.117-123.

W

Walters, P.G.B. (1997). Global Market Segmentation: Methodologies and Challenges, *Journal of Marketing Management,* 13, pp.165-177

Waugh, E. (1943). *Work Suspended and Other Stories*. Harmondsworth: Penguin Books.

Ward, P. (Ed.). (1968). *Conservation and Development in Historic Towns and Cities.* Newcastle upon Tyne: Oriel Press Limited.

Webster, F.E., and Wind, Y. (1972). A General Model for Understanding Organizational Buying Behaviour, pp.156-167. In Enis, B.M., Cox K.K., and Mokwa, M.P. (Eds.): (1991) *Marketing Classics,* eighth edition, Upper Saddle River, N.J.: Prentice Hall International, (1991), originally published in *Journal of Marketing*, 36, pp.12-19.

Whitbourne, S.K., and Weinstock, C.S. (1979). *Adult Development, The Differentiation of Experience.* New York: Holt, Rinehart and Winston.

Whitehand, J.W.R., Larkham, P.J., and Jones, A.N. (1992). The Changing Suburban Landscape in Post-War England. In *Urban Landscapes - International Perspectives*, Whitehand J.W.R., and Larkham, P.J. (Eds.). London: Routledge.

Whitehand, J.W.R., Morton, N.J., and Carr C.M.H. (1999). Urban morphogenesis at the microscale: how houses change. *Environment and Planning 'B': Planning and Design,* 26, pp.503-515.

Whittington, G. (1983). *Inflation Accounting.* Cambridge: Cambridge University Press.

Wilkie, W.L. (1990). *Consumer Behaviour (second edition).* New York: John Wiley & Sons.

Williams, P. (1987). Constituting class and gender: A social history of the home, 1700-1901. In Thrift, N., Williams, P. (Eds.), *Class and Space: The Making of Urban Society.* London: Routledge and Kegan Paul, pp.154-203.

Wilson, M.A. (1996). The Socialization of architectural preference. *Journal of Environmental Psychology*, 16, pp.33-44.

Winfield, P. (1987). *Predicting the Property Market.* London: Healy & Baker.

Winnick, A. (1994). *Obsolescence in Office Buildings.* Unpublished University of Cambridge M.Phil paper.

Woo, H.K.H. (1992). *Cognition, value, and price: A general theory of value.* Ann Arbour: University of Michigan Press.

Wooley, T. (1985). Community Architecture: An Assessment of the Case for User Participation in Design. In Klein S., Werner R., and Lehman S. (Eds.), *EDRA 16.* New York, pp.250-256.

World Commission on Environment and Development. (1987). *Our Common Future.* Oxford: Oxford University Press (Brundtland Commission)

Worsley, G. (2000). Hip hip high-rise. *The Daily Telegraph,* August 19, 2000, p.A6.

Wright, G. (1981). *Building the Dream: A Social History of Housing in America.* New York: Pantheon Books.

Wunsch, G.J., and Termote, M. (1978). *Introduction to Demographic Analysis.* New York: Plenum Press.

Y

Yelling, J.A. (1992). *Slums and Redevelopment: Policy and Practice in England, 1918-45, with particular reference to London.* London: UCL Press Limited.

Young, M. (Ed.). (1968). *Forecasting and the Social Sciences.* London: Heinemann Educational Books.