CAN THE VALUE OF DESIGN BE MEASURED?

JOHN BOON

UNITEC, Auckland, New Zealand

Abstract:
The measurement of the value of design is a problematic matter involving complex subjective judgements. This paper addresses the question within the context of design of bespoke residential houses. It draws on micro economic theory to argue that value such as these can only be measured ordinally as preferences relative to other things within the context of the total amount of monies available. It notes however that market or exchange values do impact. It then draws on work by Paul (2000) to suggest how the underlying drivers of these values can be articulated using "modes of involvement" as a frame of reference.

Key words: Design, measurement, modes of involvement, value.

INTRODUCTION

The purpose of this paper is to contribute to the debate regarding how the value of design can be articulated and measured, particularly in the context of the dialogue that occurs between client and designer as the design is developed. This is a complex matter within which subjective judgements often predominate. In order to constrain the debate within this paper it is focussed on the value of design as it relates to bespoke designed residential dwellings. This context has been selected as it substantially eliminates the issues of investment return as the predominant value that occurs in the context of commercial buildings. However, it is accepted that the issue of investment return as a value is not entirely eliminated.

DEFINITIONS

Value:
The Concise Oxford Dictionary has thirteen definitions, the first six are believed to be relevant to this paper and define in broad terms the issue being explored:

1. the worth desirability or utility of a thing, or the qualities on which these depend (the value of regular exercise)
2. worth as estimated; valuation (set a high value on my time)
3. the amount of money or goods for which a thing can be exchanged in the open market
4. the equivalent of a thing; what represents or is represented by or may be substituted for a thing (paid them the value of their lost property)
5. (in full value for money) something well worth the money spent
6. the ability of a thing to serve a purpose or cause an effect (news value; nuisance value).

Design:
Confusion can arise as to whether one is debating the value of design as a process or the value of the features designed into the end product. Through the body of this paper, the focus is on the value of the features designed into the end product.

NATURE AND CLASSIFICATION OF VALUE

Rescher (1969) argues that value is:

- *Benefit orientated: it is an expression of the benefit, or needs satisfaction a person derives from a thing.*
- *Subjective: the value a person will place on a thing will depend on their needs at the time, the extent to which the thing will satisfy those needs and what alternative satisfactions to their needs are available to them.*
- *Relational: the value arises from the interaction between a person (or collection of people) and the thing, rather than being an inherent property of the thing itself. The value is therefore dependent on the extent and nature of interaction. The value each person (or group of people) will place on a thing will therefore differ.*

Value must therefore be seen from the perspective of the person on whose behalf the valuation is being made and within the context of the benefit sought.

Lock (1973) uses classifications of:

- *Exchange value: that which enables an article to be offered in exchange for money or for an article.*
- *Cost value: the sum of the materials, labour and other costs required to produce an article or to perform a service.*
- *Use value: the sum of the properties and qualities possessed by an article which perform a use or provide a service.*
- *Esteem value: the sum of the features of the article which beyond its actual use prompt the decision to buy. (p496)*

Lock's "exchange, use and esteem" values are in line with Rescher's argument and the dictionary definitions. However the author challenges Lock's classification of "cost value" his definition is simply a historical record of cost (at best a past exchange value or series of values) does not describe a benefit and therefore cannot be regarded as a classification of value. It is disregarded in this paper.

More recent writers following similar thinking Best and De Valance (1999) use the classifications of exchange, use and esteem value. They also debate the issue of quality relative to cost and quote The Building Research Establishment (BRE) (1976) *"maximum value is then in theory obtained from a required level of quality at least cost, the highest level of quality for a given cost or from an optimum compromise between the two"*. The BRE argument, from the perspective of this paper, confuses "value" in an absolute sense with "value for money" a comparison of the benefit received with the cost of obtaining that benefit. This paper is concerned with whether value in its absolute sense can be defined and measured so that the "value for money" judgement can be made in a rational scientific manner.

Sources of Benefit
In response to Rescher's (1969) argument that value is benefit related it is useful to consider the types or sources of benefit that arise from building design. Analysis of recent publications

on the value of architecture, particularly Worpole (2000) and Loe (2000) suggests that benefits can accrue to two distinct sets of people:

- The population generally in the area where the building is located and
- The owner and users of the building.

To the first set of people benefits such as improved streetscape and urban environment can accrue. Larger buildings can provide what Worpole (2000) describes as the flagship effect; they stimulate the economies of the cities within which they are developed. Worpole cites Frank Gehry's Guggenheim museum in Bilbao, Eldred Evans & David Shalev's Tate Gallery at St Ives and Richard Roger's and Renzo Piano's Pompidou Centre. Walker (2001) has recently revisited the value of the Sydney Opera House calculating its value on the amount of tourists dollars it brings to the City of Sydney rather than on its utility as an opera house. This type of benefit which economists would describe as externalities is not the concern of this paper. This paper is concerned with the benefits that clients seek for themselves in commissioning the design of the building. Analysis of Worpole (2000) and Loe (2000) includes the following benefits that can arise directly to clients:

- Functionality – the design of the building facilitates the carry out of the desired functions within the building
- Psychological health – the nature of the environment created within the building stimulates a sense of well being amongst the occupants
- Physical health – the environment created by the building is not detrimental to physical health due to the introduction of toxins or poor air quality etc.
- Livable and social places – the design of the building stimulates a sense of enjoyment in living and encourages positive social interactions amongst the occupants and between the occupants and the surrounding community.
- Safety and security – the building provides a safe non-accident inducing environment and security from unwanted visitors etc.
- Prestige and delight – the building stimulates within its occupants a sense of pride and pleasure from using it.

Whilst this list may not be exhaustive it is sufficiently comprehensive to indicate the types of benefits that this paper is attempting to address.

MEASUREMENT OF VALUE

A Micro Economic Perspective

In addressing this issue micro economic theories concerning consumer behavior and utility are helpful. Utility represents the satisfaction a consumer derives from a good or group of goods. The theory distinguishes between total utility and marginal utility. Total utility is a measure of the level of satisfaction that a consumer derives from a particular good or basket of goods, whereas marginal utility measures the additional satisfaction derived from an additional unit of a good (when the levels of consumption of all other goods are held constant).

The law of diminishing marginal utility holds that: *"as a person consumes more and more of a given commodity (the consumption of other commodities being held constant) the marginal utility of the commodity eventually will tend to decline."* (Mansfield 1985 p52). This suggests that if utility (or satisfaction) can be measured it will not be constant.

Micro economic theory assumes that the consumer is rational and attempts to maximize total utility when making purchase decisions. In attempting to maximize utility the consumer must take account not only of their own tastes but also the prices of the various commodities and the level of their money income. The relevant points are that consumers are seeking to achieve an optimal basket of goods and services rather than maximize the marginal utility of a particular good or service. And that the overall size of this optimal basket is determined by their money income. It is acknowledged that the consumer does not always achieve optimization of their total basket for reasons such as incomplete knowledge.

Importantly, micro economic theory recognizes that utility cannot be measured in a cardinal sense. That is it cannot be measured in a hard objective sense where one basket of market goods is measured as being of 100 utils of value and another of 115 utils and the second is preferred by a measure of 15% over another. Mansfield (1985) quotes Hicks (1946) Hotelling (1935) and Samuelson (1947) to justify that most micro economists hold that **utility can only be measured in an ordinal sense, that is that consumers can only rank market baskets in order of preference but that the degree of utility or preference cannot be measured.**

Transcription to Monetary Values

Boon (1994) explored how people place a monetary value on the benefit received from a particular component or part of a building. He argued that:

- people are able to place priorities on their needs satisfaction.
- when people make decisions to purchase satisfaction of their non economic needs they transcribe the value they place on the needs satisfaction into monetary terms at least to the point where they have determined that their value is in excess of the exchange value.

He went on to argue in line with micro economic theory that the thought processes used where such monetary values are arrived at by a rationale process take account of:

- the total funds available for this purpose
- the needs currently experienced
- the priorities of needs satisfaction
- the cost of satisfying each of the needs or a combination of needs.

He suggested that where people place a monetary value on the benefit derived from a component of a building, they use a thought process similar to that used by valuers and property developers to determine the value of a piece of land for development purposes. That is the total value of the complete development is determined and then all other costs and margins are deducted to arrive at a “residual” valuation. Boon (1994) then proceeded to demonstrate with the aid of Fig 1 that if this process is applied to each component in turn it is found that the value of each component is dependent on the cost of all other components and the total pool of money available. The valuation being carried out is therefore a kind of “iterative residual” valuation.

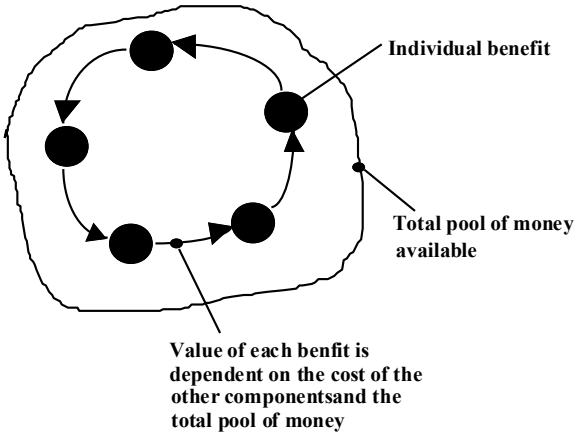

Figure 1. *Monetary valuation of a non economic benefit (Boon 1994)*

This argument can be extended to demonstrate that if a further component is introduced as being essential whilst the total pool of money remains unchanged then the value of all existing components is reduced. Further examination of this argument suggests that this process is questionable as a valuation at all, it is in reality simply an affordability check, or part of the process of deciding what mix of components is most desirable. It demonstrates and reinforces the argument that values of this nature are relative and can only be measured ordinally.

LEVELS OF DECISIONS

Examination of the decisions involved in determining the design of a house that maximizes value to the client suggests that decisions have to be made at a number of levels e.g.:

- The decisions regarding how much is to be spent on the house relative to the purchase of other goods and services.
- Decisions regarding type and number of spaces and their configuration for instance should ensuites to all bedrooms be traded for a study.
- Decisions regarding the quality of finishes and hardware

Whilst it would appear logical to work through these layers sequentially Lawson (1990) and Schon (1991) have both identified that this does not work well in practice. They argue that the complexity of the problem is such that designers find it preferable to work in what Lawson terms a “solution orientated” mode by postulating design solutions and testing them with the client to further elucidate their requirements and their values. Much anecdotal evidence exists of clients changing their mind during this process regarding the total budget, when they have a better understanding of what can be obtained for a given budget. This change in budget can be seen as a shift in priorities between expenditure on the house and on other goods and services. Although neither Lawson or Schon discuss the process in these terms this type of iterative processing may be necessary in part because the client is only able to reveal their values by expressing preferences between alternatives and this can only be done when alternatives are presented to the client.

DETERMINANTS OF THE VALUE OF THE DESIGN OF A HOUSE

It is suggested that determination of the value of the design of a house is a complex multi dimensional problem as illustrated by Fig 2. The value is expressed by preferences between alternative goods and services and alternative designs. At the same time it is influenced by

exchange values. Other people who engage with the house differently to the owner will place a different value on it.

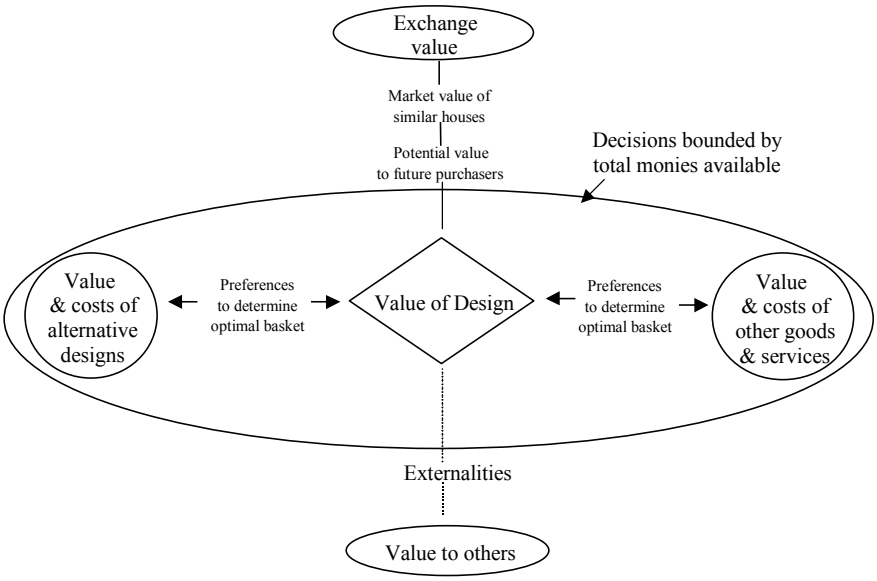

Figure 2. *Determinants of the Value of the Design of a House*

Determination of the Total Amount To Spend

It is not unreasonable to suggest that most people determine the amount they will spend on their house by taking account of the total capital funds they have available, their current and future earnings and their borrowing capacity. How much they spend on the house rather than on consumer goods, other capital goods or savings is determined by their own needs and preferences. If this amount is seen as a monetary expression of the value they place on the house it can be seen that the value is entirely subjective being determined by funds available and competing wants and needs. As the design evolves the client may decide to change their mind regarding the desirability of the house relative to other satisfactions and may therefore decide to spend more (or less) on the house.

However, it is suggested that most home purchasers when making these decisions are aware that:

1. They can purchase an alternative house that will provide similar benefits on the open market
2. The investment in the house is not only a purchase to satisfy their wants and needs as consumers but is also a capital investment. They will therefore have some regard to the resale value of the house.

It therefore can be seen that two value sets interplay to determine the monetary value the client places on a proposed house. One set of values are driven by Lock's (1973) notions of use and esteem. The other values derive from the market as exchange values (which it could be argued are a complex aggregate of the population's in general use and esteem values).

The Value of Components of the Design

It has been argued above that values of this type are relative and can only be measured ordinally. These values are expressed as preferences relative to alternatives. To discuss the values it is therefore necessary to be able to articulate how people establish these preferences.

Paul (2000) describes Kodak's research in a similar area, reporting their attempts to measure consumer preference between design features on similar cameras (Paul 2000). Note how this problem has been reduced to a layer of the consumer decision making. They are not concerned with the decision to buy a camera at all, nor with the area of price and functionality required only with the choice between relatively similar cameras. Based on computer analysis of interviews of purchasers they have concluded that purchasers can be seen as having a variety of modes of involvement with a product. These include:

- *Practical involvement, or functional utility: the degree to which the product fulfills its intended purpose*
- *Intellectual involvement: the degree to which the product stimulates curiosity, or holds potential for developing knowledge or skill*
- *Emotional involvement: the degree to which the product enhances the ego, self-concept, or self-ideal*
- *Social involvement: the degree to which the product represents affinity to a political, social, economic, religious, or intellectual group (Paul 2000 p73).*

Kodak have gone on to developing a process of perceptual mapping that displays the buyers level of involvement for each of these four modes.

They have also developed a set of measures of emotional involvement as set out in Table 1 below:

Psychological Process	**Measure (for Application to Scales)**
Internal/Core Self	This product "is like me/is not like me."
Personal Identity	This product gives/does not give meaning to what I want to become.
External Self	I would like to be seen using/would be embarrassed to be seen using this product.
Joy of Self	This product is great fun to use/no fun to use. This product makes my life better/worse.
Identification	This product does/does not give meaning to what I do.
Mood	I am at ease/not at ease with this product

Table 1. *Measures of Emotional Involvement (Paul 2000 p75)*

These "measures" are scored on a 1-5 scale through a process of purchaser interviews.

Paul does not suggest that Kodak have attempted to pull these measures together to form an aggregate "best design" score. If one accepts Mansfield's (1985) argument that these things can only be measured ordinally it would seem futile to attempt such an exercise. However, Paul's "modes of involvement " and measures of "emotional involvement" do seem to provide a language to facilitate debate of the benefit of the components of a design. They add sophistication to Lock's (1973) notions of "use" and "esteem" value and help explore the underlying drivers of the values being ascribed.

CONCLUSION

This paper has sought to describe how the value of design can be articulated and measured within the context of bespoke residential dwellings.

As defined by Rescher (1969) value is benefit orientated, subjective and relational. Any attempt to describe value must therefore be made from the perspective of the person seeking the benefit and within the context of the benefit being sought.

It must also be recognized that value is subjective and determined by competing wants and needs and the total purchasing power available to satisfy those wants and needs. As such values of this type can only be expressed ordinally in terms of preferences to alternatives. However, such values are also influenced by market values as a client is unlikely to decide to purchase a given design or design component if satisfaction of the benefit being sought can be achieved through the purchase of a cheaper good elsewhere in the market.

Whilst these values can only be measured ordinally Paul's (2000) language of "modes of involvement" and measures of "emotional involvement" provide suitable tools for discussing how a client develops their preferences for various design alternatives.

The conclusion that values of this nature are relative and can only be measured ordinally reinforce conclusions reached through alternate routes by Newton (1990) and Kelly (1990) that the value of a property development project cannot be optimized in a scientific rational sense. The best that can be achieved is that a "satisficed" position is reached. Satisficed is a term coined by Simon (1975) to describe the position reached when the debate has been continued and the options explored until the parties are satisfied that an outcome that is "good enough" has been achieved.

These conclusions also help explain the usefulness of processes such as Value Management that facilitate debate between client and designer. Green (1992) has identified these processes as structured decision conferences within which a "shared social reality" is achieved that satisfices the participants, rather than scientifically rational decisions are made. Given that the values used in making these decisions can only be expressed as preferences this would appear to be the best that can be achieved.

Paul's (2000) language of "mode of involvement" and measures of "emotional involvement" indicate the type of language we need to articulate the value of design. High value design may, through this language, be seen as design that maximizes the client's satisfaction from engagement with the product (in this case the house) in terms of their practical, intellectual, emotional and social involvement, within the context of their preferences relative to other things.

REFERENCES

Best, R. & G. De Valence (1999) *Building in Value – pre design issues*; Arnold; London.

Boon, J. (1994) *Enhanced Value Generation during the Design Process – The Search for Optimisation and the Measurement of Value*; Proceedings of Internet World Congress; Oslo,

Green. S.D., A SMART (1992) *Methodology for Value Management*. CIOB Occasional Paper No 53. Chartered Institute of Building. London.

Hicks, J. (1946) V*alue and Capital*; Oxford University Press; Oxford.

Hotelling, H., (1935) *Demand Functions with Limited Budgets*; Econometrica.

Kelly, J.R. (1990) *Building Design Optimisation*. Proceedings of CIB90 Symposium on Building Economics and Construction Management. Eds V. Ireland, H. Giritli, C. Roberts, M. Skitmore.

Lawson, B. (1990) *How Designers Think*; Butterworth; Oxford.
Lock, D. (1973) *Engineers Handbook of Management Techniques*. Gower Press, Hampshire.
Loe, E. (2000) *The Value of Architecture - Context and Current Thinking;* RIBA; London.
Mansfield, E. (1985) *Micro Economics*, Theory and Applications; Norton; New York
Newton, S. (1990) *Formal Optimisation and Informal Design*. Proceedings of CIB90 Symposium on Building Economics and Construction Management. Eds V. Ireland, H. Giritli, C. Roberts, M. Skitmore.
Paul, J.J. (2000) *Performance Metrics to Measure the Design*; Design Management Journal.
Rescher, N. (1969) *Introduction to Value Theory*; Prentice Hall; New Jersey.
Samuelson, P. (1947) *Foundations of Economic Analysis*; Harvard University Press; Cambridge Mass.
Schon, D.A. (1991) *The Reflective Practitioner*; Gower; Vermont.
Walker, D. (2001) *Cost Versus Value*; ProDesign 51; Auckland.
Worpole, K. (2000) *The Value of Architecture – Design, Economy and the Architectural Imagination*; RIBA; London.