Architecture & Environmentalism: Movements & Theory in Practice
Rosi Fieldson
Postgraduate Researcher
University of Newcastle upon Tyne, UK

Keywords: Environmentalism, Architecture Theory, Environmental Architecture, Sustainability

Abstract
Towards the end of the last century, the environment came to the forefront of architectural debate. Whilst opportunities for improving the environmental performance of housing and offices have been investigated, the retail sector has seen limited application of environmental theory. This paper is part of a larger work considering the place of environmental evaluation in retail architecture, particularly the whole life costing approach. The research aims to develop understanding of such methods in case study application and develop these methods to aid environmental decision support modelling in the retail sector.

Introduction
The aim of this paper is to establish the relationships between environmentalism and architecture and where environmental analysis relates to the theoretical background of this subject area. This will be approached through two objectives:

1. Mapping of the development of Environmentalism,

Environmentalism
Environmentalism covers a broad spectrum of ethical, political and scientific ideologies, Figure 1. Concepts such as sustainability, introduced by Goldsmith in Blueprint for Survival (1972), became more widespread following the 1987 Brundtland report. However, the meaning of sustainable; able to be exploited indefinitely without depletion, has been surpassed by a pre-fix of sustainable equalling “good for the environment”. A similar shift in usage is true of “Green”, initially associated with the Green Party, is a term still commonly used as an umbrella term pertaining to a mindset that is the opposite of the exploitative or capitalist. This use of manipulative terminology is in evidence in many disciplines.

The word Ecology, derived from the Greek oikos – house and logos – understanding, has been in use since German Biologist Ernst Haeckel first used the term in 1878 (Pope, Appleton, Wheal, 1991 p.85). Ecologists study the world as a balanced system of natural forces in which no living thing exists in isolation. Ecology is the scientific study of ecosystems, not a political or philosophical viewpoint. Ecosystems can be viewed with human life as an externality, or alternatively that all species including mankind are integral to the ecological balance.

Environment
- the conditions that affect the behaviour and development of;
- the physical conditions that exists;
- the natural world in which people, animals and plants live.

Environmentalism
- concerned about the natural
- environment and a desire to improve and protect it.

Ecology
- the relation of plants and living creatures to each other and to their environment;
- the study of this.

Sustainable
- involving the use of natural products and energy in a way that does not harm the environment;
- an action that can continue or be continued for a long time.

Sustainability
- development that meets the of the present without compromising the ability of future generations to meet their own needs.

(Brundtland Report 1987.)

Figure 1. Definitions
Environmental instability is caused by imbalance between population, resources and pollution. As population increases, resources are used faster and more pollution is produced, each having an exponential effect on the next. Although these problems are distinct, they are part of an interrelated network of positive and negative feedback loops effecting a multitude of other systems involving economic social and technological change.

Mapping Environmentalism

Environmentalism has developed, evolved and diverged into a complex network of ideas and behaviours, attempts to portray the historical development of environmentalism to the present day allowing the interpretation of shifting patterns in policy and action. In the earliest times a view of the universe existed that stems from Pagan and religious ideas that were closely allied to nature, this Natural Magic was widespread until the Renaissance, Figure 2. Alongside this belief was Aristotelian science and the Anthropocentric view of Medieval Cosmology, where the celestial regions encircled the Earth and Man had dominance over nature. Critically this sets out the notions of how Man relates himself to the environment, either, less than, equal to, or greater than the environment. The Scientific Revolution of the 16th Century saw a gradual shift with Natural Magic evolving into Romanticism and Aristotelian science into Newtonian Science. Two analogies developed reflecting this divergence, likening the environment to a huge biological model, and conversely, to the mechanism of a clock, or machine.

Pepper (1984) suggests that Romanticism was one of the early forms of ecologist thinking, stemming from a reaction against the rational progression of science and technology in the late Victorian period. Leading up to this period, landscapes that had escaped cultivation became increasingly appreciated for the sublime qualities of their wilderness. Ideas of utopian self-sustaining communities were developed in the 19th century. Essentially romantic idealism, the idea of using ones own hands to produce food and home comforts was attractive in an increasingly mechanized society. However, the missionary zeal of this kind of environmental and social engineering was based on an idealism that had infeasibility as its basis (Borsi, 1997, p.10). A less idealist liberal movement, which concerned itself with a peaceful existence and getting back to nature persisted well into the 20th century with a major Neo-Romanticist insurgence in the 1960’s and 1970’s.

Between these two extremes, a separate theory developed. Pepper (1981) suggests that this middle ground is the domain of social sciences stemming from the ideas of Francis Bacon. This ideology allows science to become the servant of Man, providing better quality of life through improving all manner of circumstances. As the use of science is very often to benefit those who can afford to fund it despite suggestions by the authority and the scientists that such work is supposedly for the good of all.

The application of this new social science was manifest during the industrial revolution which in turn gave rise to capitalism and widespread exploitation of natural resources.

Through Malthus and Darwin, a form of environmental determinism has endured where humans and animals behave in a certain way, particularly in a competing manner in order to secure survival, an idea promoting capitalism. At the same time, Darwin’s ideas of balance and the interrelated nature of life on earth has supported the GAIA hypothesis of James Lovelock (1979). This systems approach to the environment suggests that the whole is greater than the sum of the parts, and that the environment is an indivisible system. Despite this contradiction, Darwin and Malthus’ environmental determinism have supported an intersecting ideology.

These three models of Systems, Social science and Mechanisms approaches allowed the environment to be understood in very different ways, and very different conclusions were drawn about how it worked, these analogies have endured to the present day.

More recently, interest in our relationship with the environment was re-established by a number of publications responding to damage to wildlife caused by farming techniques (Carson, 1969) and the oil crisis of the 1970’s (Goldsmith, 1972 and Meadows, 1972), Figure 3. Whilst both Goldsmith and The Club of Rome took population growth as the prime driver of imbalance in their world systems, they had very different approaches for tackling the problems of the environment. The Club of Rome introduced the idea of a technologically optimistic society, (Meadows, 1972 p.129) one that believes that environmental problems will be solved by technological solutions. When modelled, applied technological solutions are portrayed as prolonging the period before system collapse, but not eradicating it (Meadows, 1972 p.140) leading to the conclusion that technological solutions alone will not result in stability.

Goldsmith (1972 p83-86) advocates a change to the value system of the developed world, where growth of economic supply and demand has been central to so-called stability. Real value or social accounting not economic value was the key to non-growth economy to achieve sustainability. This idea is essentially Ecocentric and challenges the Technocentric model of the world as a machine, definitions established by O’Riordan (1981, p.1).

Strong political significance is attached to these two opposing ideologies. Commoner (1992) particularly sees...
Figure 2. Environmentalism Map: part I
Figure 3. Environmentalism Map: part II
the Technocentrists as traditional right wing and capitalist and Ecocentrists as left wing. He goes on to suggest that many of the world's ecological problems have been caused by allowing market mechanisms to override all other concerns. He points out that market driven economies can create markets for seemingly environmentally benign products, but only at vast profit to the supplier. He asserts that failures in the technosphere are visited as effects upon the ecosphere, which adds further force to his condemnation of the Technocentrists. In order to counteract this point he suggests that the largest socialist regimes (USSR, Eastern European Nations and China) have had disastrous effects on their environments (1992, p. 219-220). Whilst Commoner admits that neither end of the spectrum is faultless, he adds further divisions of Fundamentalists and Realists between the ecocentric and technocentric extremes.

Pepper (1984) asserts that Technocentrism is the dominant and authoritative attitude to the environment in Western society and the one which is held by those which exercise the most power. This view according to Pepper is a result of the overriding approach of classical science that has been dominant since the 16th century. He argues that rationalism in the scientific world has created a dualism, inspired primarily by Descartes, that matter is composed of primary qualities that are measurable, and secondary ones that are subjective and may only exist in observation. This empirical science is not influenced by social, cultural or aesthetic ideas. Ecocentrism opposes this view with emotional and subjective ideas being paramount. This dichotomy was undisputed until the resurgence of subjectivity in sub-atomic physics and Quantum Theory, Pepper (1981). O’Riordan has suggested a relationship between these environmental extremes and religion, with western Judeo-Christian ideas more easily relating to technocentrism and Eastern religions relating to ecocentrism. Pepper disputes this, suggesting that both ideas exist in Christianity, however, dominance over nature appears to have succeeded over an affinity with it alongside the developments in scientific thought that threatened to dispute Biblical ideas.

Whilst he dichotomy between the technocentric and ecocentric ideologists has persisted to the present day, the deterministic central ideology has not been so well defined, some further clarification was established by O’Riordan (1981), Figure 4. Protestors at the most ecocentric end of the scale and Activists straddle Commoner’s Fundamentalists. Reformists take the central route between the extremes. Conformists represent the pure technocentrists and Inactivists are beyond the previous scale representing the point of view of extreme capitalists. Diversification of environmentalist spectrum may go some way towards de-politicising the arguments, particularly in the UK where the distinction between the main political parties has become blurred. By the late 1980’s, it was becoming clear that individual countries were not able to make significant impact in environmental issues without the support of their neighbours. More importantly, it was recognized that the developing countries of the world needed aid to avoid making the mistakes of the developed world in managing their own environments. The first Earth Summit took several years of planning. In 1992, The United Nations Conference on Environment and Development was held in Rio de Janeiro. It led to the creation of Agenda 21, a document promoting sustainable development throughout the world and conventions on climate change; biological diversity and sustainable development were also agreed. The key achievements of Rio were not the documents themselves, but the increased public awareness of the issues involved and a desire locally to follow the ideas set out in Agenda 21. Local Agenda 21 was adopted by many councils and planning departments. It is important to note that China, Russia and the US continually refuse to sign up to the agreements to reduce emissions and consumption of resources that the rest of the world’s nations have accepted. Whilst sustainability as a concept has been adopted by both left and right wing policy in the UK, the concept is still diverse enough to be implemented from an ecocentric or technocentric point of view. Today, Socio-Economic Environmentalism, attempts to benefit everyone and everything by balancing social economic and environmental sustainability. In practice this is difficult to control and prove, and like pre-industrial social science, is prone to exploitation by the sponsoring authority.

Environmental Architecture
Defining architectural styles and theoretical standpoints has long been a pre-occupation of the architectural profession. The practice of establishing a paradigm has been in existence from the start of the neo-classical period. Architectural history and theory has traditionally been taught as a chronology of styles and movements, with special interest in the conflicts between styles, such as the Gothic and Classical in the 19th century, and Modernism and Postmodernism in the 20th. This mindset leads the profession to attempt to apply names to classify a particular design approach. Although Van Der Ryn and Cowan (1996, p. 12) argue that architects had no environmental vocabulary prior to 1970’s, there is a body of architectural work that has reflected on man’s position within the ecology of the earth prior to the advent of 20th century environmentalism. This section of the paper will attempt to clarify the emerging terminology and aesthetic relationships between environmentalism and it’s expression in the built form. This section will demonstrate that Architecture has closely reflected the period of development of Environmentalism since the 1960’s.
Figure 4. Environmentalism Map: part III
Figure 5. Environmental Architecture Map: part I
Mapping Environmental Architecture

The following mapping diagram is set out in a similar way to the previous mapping of Environmentalism, a format made familiar in architecture by Jencks, Figure 5.

There is a consensus (Olgyay 1963; Hawkes 1996; Hagan 2001) that the earliest writings that considered the nature of the environment and how it is made apparent in building were evident in Vitruvius, Figure 6, and these three requirements considered the most fundamental requirements of buildings. This method of resolving the needs of the building user in the form and materials of a building has been fundamental in establishing civilization in climates where the unprotected human could not survive.

![Figure 6. Vitruvius' Formulation](image)

Vernacular building techniques from all climatic regions have allowed communities to thrive in harsh environments. Commonly they respond to diurnal and seasonal variation well and use locally sourced materials. This makes vernacular buildings inherently environmentally responsive. Cultures tend to rely less on vernacular wisdom as they experience economic development and increasingly consider fashion and taste as the prime motivators of their architecture. The result is increased consumption of materials from further a field, and introduction of architectures that are less appropriate for the local climate, necessitating increased servicing loads. In many developed societies, the rediscovery of the methods of vernacular architecture has fuelled both theoretical work and built examples. Hagan (2001, p103) suggests that those who use the vernacular as a generator of environmental solutions fall into two groups; (ecocentric) anti-industrial pro-craft revivalists and those seeking theoretical models for passive environmental design. In some developing nations however, use of vernacular can be perceived as patronizing sentimentality (Hagan 2001, p118) or crude climatic and cultural determinism.

Colonial development establishing Western European architects and building practices in diverse climates may have resulted in forced development of building technology and design initiative to cope especially with heat and humidity in tropical zones such as Lutyens work in India. The same is true of New World architecture of this period (Banham, 1984 p. 305). Banham (1984, p44) suggests that the introduction of internal electric lighting was a considerable factor in the advancement of the new styles of architecture from Art Nouveau in the 1890’s. Both the work of Morris and Ruskin have many references to the environment and the potential dangers of industrialization. This Romantic Movement in architecture was strongly associated with early environmentalism (Pepper, 1984) and has informed the development of Arts and Crafts and Organicist architectures.

Though not consciously related to the threat of environmental collapse, the relationship between man and the environment in terms of comfort and well-being was well explored, not least by Le Corbusier, who’s writings have been used by designers to inform their work (Vale 1991 and 1996; Olgyay 1963). Modernism and functionalism have been suggested by many (Hagen 2001, p151; Slessor 1997) to have strong links with environmentalism if the “function” of a building is partly the modification of the external climate to provide comfort. Banham however contests that the German functionalist schools such as Bauhaus ignored most thoroughly the “human concepts of environmental quality” (p124) evolved before 1914. In addition, Banham (1984, p304) suggests that the intention of the International style modernists had been to rid the world of the inadequacies of vernacular architecture. Thus, the relationship of environmental architecture and Modernism is somewhat paradoxical in nature. Perhaps the strongest factor of modernism that positions it firmly as the progenitor of technological solutions is the precept that technological progress leads to material growth and the technocentric machine aesthetic.

Olgyay (1963) wrote about the interlocking fields of climate balance as early as 1963. Shown in Figure 7, very much like Vitruvius, his work has no pretensions to aesthetic style whilst maintaining the need to tie the technology into good design. Givoni (1969) followed Olgyay with a more scientific approach to the same problems of climate and comfort without any suggestion of how good aesthetic architecture is achieved developed from the technology.

The environmental architecture of the 1970’s concentrated on energy prompted by the developments in environmentalism surrounding the oil crises as discussed.
in the previous section. The amount of energy used in the running of buildings has increased due to the introduction of building services during the course of the last century (Banham 1984 gives an historical account). Solar power and the ideas of passive solar design and passive ventilation grew into the main concepts used to define the architecture of the period. These principles made a dramatic impact on domestic and housing design and were generally more applicable to the way of life of most people. The concept of Low Energy Buildings was introduced, although still mainly realised as homes designed for one-off clients and architects themselves, a few local authorities began to take some interest in reducing running costs of housing through passive solar design. By that time, environmentalism had taken on its political meaning and environmental design was becoming more self-conscious. In the preface to the second edition of Givani (1969) written in 1976, he acknowledges the new relationship of man in the environment that had become current since the first publication.

Banham (1984) categorizes building types into four modes of environmental control; Conservative, Selective, Regenerative and Exclusive (Figure 8). The Conservative Mode aims to temper changes in external climate by thermal storage, primarily by massive walls. Banham saw this as the “the ingrained norm of European culture.” (p.23). The Selective Mode expels unwanted conditions and admits the desirable and has always been mixed with the conservative in elements such as windows, shades and ventilation devices. The Regenerative Mode applies energy in the form of heating or cooling and introduces artificial light. In traditional construction, all three modes are employed but most built forms tend towards one or other mode. Banham claims that the Conservative/Selective mode “…sees power consumption as an embarrassing aberration. Their embarrassment was fortified in the Sixties and Seventies by the growing tide of concern about pollution, energy costs and the depletion of finite natural fuel resources.” p.277 the response in Banham’s opinion was the “passive” Solar Movement in architecture. This movement was primarily concerned with low technology and rarely explored actual “active” solar power. Banham saw the majority of this movement as fanatical and to a certain extent exploitative of the domestic (female) effort required to alter blinds, open vents etc. Banham’s fourth Exclusive mode has no relation with the environment and is typified by highly serviced buildings. These are designed in a manner that makes an internal environment sealed completely from the external.

Hawkes (1996, p. 14) demonstrates a climate balance diagram of biology, climatology, architecture and technology very much in the manner of Olgyay, Figure 9. However, his definitions of building types (1996 p109) follow in the pattern of Banham; Pragmatic, Exclusive and Selective. Where Pragmatic ignores environmentalist themes, Exclusive reflects a more considered level of
Figure 10. Environmental Architecture Map: part II
design than Banham’s mode but still works exclusively form the external environments. The selective magnet filters the external environment in a combination of Banham’s Conservative, Selective and Regenerative modes.

A number of commentators have chosen to dissect environmental architecture into two camps. These two categories are a direct parallel with O’Riordan’s Ecocentric and Technocentric ideologies. Guy and Shove (2000, p.13) define these ideologies respectively as those that feel social responsibility and those that wish save on energy and material costs for their own benefit. Similarly, Lloyd Jones (1998, p.11) claims that there are two profoundly opposed schools of architectural thought, Cultural-fix and Techno-fix. This dichotomy represents those (ecologists) who believe that a change in the culture and attitudes of society (even if they have to be enforced by regulations or levies) is prerequisite, and those (technologists) who see technology providing the answers to the problems we have forced upon the environment thus allowing society to continue to function as it has evolved over the centuries of industrialisation. These two schools have profoundly different design methodologies.

Ecologists, Van der Ryn and Cowan (1996) suggest that the esoteric aspects of design are critical. These are listed as nature, place, biodiversity, vernacularism and

---

**Figure 11. Environmental Architecture Map: part III**
manifestation of didactic teaching through design. The ecological approach has further developed into a more defined ecology theory by the use of observations of ecosystem as models or metaphors to help in the design of construction and industrial projects (Kibert et al 2002). This group argues that we have become ecologically illiterate through our separation from the natural environment by the built environment and that we need to rediscover our relationship with nature through this representation. This principle is *Ecomorphism*, where a building is representative of a system as opposed to *Biomorphism* where a building represents the form of an organism. They would also argue that this is not an ideology but a scientific methodology although not one that follows the rules of empiricism (Van der Ryn and Pena in Kibert et al 2002, p2132).

Technologists, Thomas and Fordham (1996) offer five elemental considerations required to form buildings with an energy balance through the measurables of skin materials and U values, site planning, energy use, comfort and daylight, solar, ventilation, material solidity, air quality and moisture. Slessor (1997) suggests an association with High-Tech, recommending works by Foster, Rogers, Grimshaw, and Hopkins as examples representing application of the technological approach.

Hagan (2001) concludes that there are three categories of environmental architecture; *Symbiosis*, *Differentiation* and *Visibility*. Symbiotic design uses statistical factors to constrain it’s brief. Hence it falls very much at the technological end of the spectrum. Hagan suggests that one reason why Symbiotic architecture is closely related to the modernist and high tech stream is the ease of calculation of environmental effects in and around orthogonal and regularized forms reflecting the International Style (p149) thus representing the technocentric school. Hagan divides differentiation into two distinct methodologies; *Cultural Differentiation* responds to the vernacular and social aspects of the genius loci, through an understand of the lifestyle of an indigenous people, it is believed that a design solution will by nature respond to the environment. *Climatic Differentiation* however uses geographical and meteorological data to formulate a scheme. Both of these respond to Vitruvian ideology through Olgyay and Hawkes, and as such reflect Darwinian determinism. Hagan’s architecture of Visibility is defined by the intent to make environmental ideas clearly legible in the aesthetic treatment of a building. It allows the conception of architecture as art to remain in place. Hagan is willing to accept that all three categories are distinguishable in the work of many architects, however one will be dominant. It is also suggested that they are a layered profundity of thought in the environmental design process. As an example of one way of designing, Symbiosis is the initial requirement to achieve fixed requirements or targets, the designer may then go on to respond to the local environment of the building and finally attempt to make their design efforts visible to the user.

Guy and Farmer (2001) split sustainable architecture into six categories using built examples and architects for definition. This *metalogic* spans the ecologist to technologist spectrum; *Eco-technic*, *Eco-centric*, *Eco-aesthetic*, *Eco-cultural*, *Eco-medical* and *Eco-social*. Eco-technic represents a broad grouping of methodologies from Hawkes’ Pragmatic to Selective modes. Eco-centric is the antonym of Eco-technic. The other four are between these extremes, with Eco-aesthetic corresponding with Hagan’s Visibility; Eco-social and Eco-cultural straddle Cultural differentiation and flow from Vernacularism and bioregionalist traditions. Eco-medical is a direct descendant of Givoni (1969) and Hawkes(1981) on positive human environments but has now encompassed sick building syndrome, employee efficiency and other more recently researched phenomena that regard human health and well-being in internal environments.

Today, as a parallel of socio-economic environmentalism there exists a principle of balancing three aspects of sustainability, Figure 12. Whilst design methodology respects a middle ground between ecocentric and technocentric concerns, it does not result from the determinism but rather an acceptance of aspects of all three standpoints; Ecocentric environmentalism, Deterministic socialism and Technocentric economics.

Although the mapping diagram attempts to place a number of architects within the various streams of environmental architecture, may have shown differing methods in differing situations such as Le Corbusier’s machine ethic contrasting with his work in India. Others, such as Erskine have evolved over long careers and have shifted slightly from one stream to another. The use of the work of certain architects to define methodologies can be misleading. One such is example Ken Yeang. Yeang has his own philosophy, which he calls Bio-climatic architecture. It is derived from the deterministic geographical and climatological principles of Olgyay whilst allowing
expression through new materials and building forms such as the skyscraper. The main constraints of Yeang’s architecture are to reduce energy consumption whilst improving comfort; both very beneficial to the client. He confesses that he pays little service to the constraints of life cycle analysis or sustainable development (Richards 2001, p11-12). Jencks sees Yeang as Organitech (Rattenbury 2002). Guy and Farmer (2001) give Yeang’s work as an example to typify their Eco-technic Logic. Hagan (2001) describes Yeang’s work as Climatic Differentiation, whilst Lloyd Jones defines Techno-fix. Yeang’s earliest writings introduce Bio-climatics very much in the style of Givoni, Olgay and Banham, forcing Yeang’s work into a less Technologist position. Close scrutiny of his architecture would suggest much less attention to technical measurement of building performance and in contrast a keen interest in more the softer aspects of low-tech and passive environmental tempering such as planting, water features and appropriate materials for internal environments. This suggests that the outward symbolism of environmentalism (Hagan’s Visibility) may in some circumstances override both Differentiation and Symbiosis thus inverting Hagan’s theory of progression of environmental design sophistication.

This form analysis of architecture can never be fully fixed as Jencks has demonstrated by publishing an appendix to his original chartering of twentieth century architecture (Rattenbury 2002). It is apparent that the definitions used by writers and designers have been interpreted by each to explain their own ideas relating to their work or their reaction to the work of others in the context of the environment as we are presented with the environmental problems of the time in which the definition is used. The wealth of environmental architectural history cannot be denied, however, we must remember that this represents a very small fraction of the construction industry as a whole. If all construction were to have sustainability in it’s brief regardless of the other constraints and requirements of the client, all work should find its place within the spectrum of environmental ideas presented here. Whilst it can be argued that environmental architecture is not an aesthetic style, it is without doubt a movement albeit separated into three overlapping strands of Ecocentrism, Differentiation (Determinism) and Technocentrism.

Conclusion

The parallels that can be drawn between environmentalism and environmental architecture, as shown in the mapping diagrams, aids the understanding of how the architectural world has responded to the changing pressures of the three themes of environmental instability. Unlike environmentalism however, architecture bridges the divide between art and science supported by many paradigms, this sets up a tension between satisfying both objective criteria and subjective desires. The design community faces the problem of communication of their response to environmental issues and solutions to the client and the client’s market, the public. It would seem vital that in order to achieve their aims, architects need to have real and compelling proof that their designs do provide the solutions they promise. In an attempt to reconcile the conflict between economy and environment, it became increasingly popular in the 1970’s to consider environmental problems in terms of economic comparisons, such as cost benefit analysis and environmental impact assessment, in order to attempt to put a higher value on the environment. Whole life costing and other economic valuation methods of measurement have been categorized by many of the commentators advocated here as part of the technocentric methodology. To many designers who are positioned on the ecocentric and differential methodologies and do not believe that value can be placed on the environment, this may make WLC unappealing or too closely related to the right wing and capitalist notions it has been suggested to represent. Others are dismissive due to current crudeness of modelling techniques (Hagan 2001, p10).

There is no conclusive correct method for the design of environmental architecture, but it would seem that the best solutions for the environment results from the implementation of the broad spectrum of ideas of socio-economic environmentalism. However, the methodology is intensively subjective and dependant on the accurate capture of both client and externality specific values and constraints. Balance between the three forces in this methodology can only be achieved with complementary objective data offered by WLC evaluation. Whilst ethical arguments may work in academic and to a lesser extent political spheres, persuasion of the majority of construction customers is primarily economically driven, social and environmental considerations follow. In order to increase the proportion of environmentally considered built work in the construction industry, reliable complementary methods of subjective and objective analysis must be both formulated and legislated.

References


