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Better designed buildings: improving the valuation of intangibles

A literature review

Prepared by Eclipse Research Consultants

1 What are intangibles?

A dictionary definition of intangibles is:

> 'part of a business that has value or worth, but which is difficult to touch, grasp or measure…'[1]

With the rise of the knowledge-based economy, intangibles have become a topic of great interest to the valuation and accountancy professions. In an article called 'Getting a grip on intangibles', by Glenn Cheney (2001) he suggests that:

> 'If there's an accountancy issue of the century, this is it: intangibles.'

And he asks:

> 'What is it that makes Microsoft, for example, worth US$1.9bn in definable property yet hundreds of billions in market capitalisation?' Cheney goes on to identify that what investors are buying is intangible indications of future wealth.'

Many key accountancy bodies are engaged in studies of intangibles. Cheney reports on a study sponsored by the Financial Accounting Standards Board (FASB) on intangibles. The report explored the difference between purchased intangible assets, such as patents and trademarks, and those developed internally, such as employee knowledge, company reputation and relationships with suppliers. Only the former appear in financial statements, but the report found no conceptual basis for different treatment. It also found cost to be an inadequate indicator of the value of an intangible. A huge figure spent on research and development could produce a patent worth nothing, and a highly valuable patent could result from an idea that cost nothing.

A research proposal by the Brookings Institute on *Accounting for Intangible Assets (*Blair and Wallman, no date) notes:

> 'During the agricultural and industrial eras, the main sources of economic value creation were tangible assets such as land, minerals, and factories. Knowledge (always essential) was not the key component of value creation. In the information era, the source of value of products … has shifted from physical content to knowledge content. Corporate investment in intangibles, such as R&D, franchise and brand development and human capital enhancement, is growing at a substantially faster rate than tangible investment throughout all developed economies. They may be the primary contributor to the earnings power of an enterprise. Intangible assets are present in every business enterprise, yet only tangible assets and intangible assets purchased in an acquisition appear on the company's balance sheet.

[1] After Chambers 21st Century Dictionary

> A rapidly growing share of corporate wealth (and national wealth) is in the form of assets such as patents, copyrights, organizational and human capital, "goodwill" and other intangibles, as well as other items that are not usually viewed as "assets" at all -- such as customer or employee satisfaction. Increasingly, these assets and other factors are becoming the real sources of value in corporations, and in the economy as a whole, as the dominant drivers of economic activity and wealth shift away from manufacturing toward information-based services. Yet traditional accounting measures -- both those used inside corporations, and those used to construct national income and product accounts in industrial countries -- are providing less and less useful information about these items.'

In his book *Intangibles: management, measurement and reporting*, Baruch Lev (2001) uses the following definition:

> 'Intangible assets are non-physical sources of value (claims to future benefits) generated by innovation (discovery), unique organisational designs, or human resource practices. Intangibles often interact with tangible and financial assets to create corporate value and economic growth.'

Later, he defines them as intellectual capital or knowledge assets.

Lev notes that intangible assets surpass physical assets in most business enterprises both in value and contribution to growth, yet they remain absent from corporate balance sheets with the result that the reporting of firms' performance and value is biased and deficient. This is not an entirely new phenomenon – intangibles have long been known about - but their rise in importance has not been matched by changes in financial reporting. Lev shows a graph of the mean market-to-book ratio of the Standard & Poor 500 companies (among the largest 500 companies in the United States) over the period 1980 to 2001. The ratio has increased continuously from about 1.1 to about 6 or 7 in March 2001. This suggests that for every six dollars of market value, only one appears on the balance sheet, while the remaining five dollars represent intangible assets.[2]

In an appendix, Lev cites International Accounting Standard 38 (IAS 38) and how it deals with intangible assets. Its definition is:

> 'Intangible assets are defined as non-monetary assets without physical substance held for use in production of supply of goods or services, for rental to others, or for administrative purposes and that are identifiable, that are controlled by an enterprise as a result of past events, and from which future economic benefits are expected to flow to the enterprise.'

The future economic benefits may include:

> '… revenue from sale of products or services, cost savings, or other benefits from use of the asset by the enterprise itself.'

And

> 'The standard lays down rules for an enterprise to demonstrate that future economic benefits specifically attributable to an intangible asset will flow back to an enterprise. The enterprise is required to show that the intangible asset will enhance the enterprise's net inflow of future economic benefits; that is has the intention and ability to use the intangible asset; and that is has the adequate technical, financial, and other resources available to obtain the expected future economic benefits.'

[2] In a footnote, Lev explains this is an oversimplification, but that nevertheless 'the value of intangible assets is approximately three times larger, on average, than the current value of physical assets.'

There is also considerable interest in Europe. In 1999 the European Union organised a conference called 'Intangible Assets and the Competitiveness of the European Economy' The conference compared the impact of tangible investments in plant, machinery, and equipment versus intangible investments, mainly defined as research and development, marketing, advertising, software and training. In the conference proceedings, Buigues, Jacquemin and Marchipont (2000) report on the growing importance of intangibles as sources of competitiveness, and note how as far back as its White Paper on *Growth, Competitiveness, Employment*, the European Commission encouraged investment in intangibles, to support the dissemination of R&D results into products and processes. The considerations which have the greatest effect on competitiveness include standards of education and training, the efficiency of corporate organisation, the capacity to make continuous improvement and the practical application of R&D. In their concluding paragraph, they state:

> 'The transformation of our economies into an information-based economy is a fundamental new development. This reaches far beyond the economic aspects and touches strongly on social values, ranging from maintaining the basic concepts of a public service provided to every citizen, to freedom of speech and protection against intrusion into privacy.'

In the UK, there is already interest in intangible assets and their relationship to sustainable development. A paper by AccountAbility (2003) reports that addressing today's social and environmental challenges depends on the creation of economic wealth in ways that are consistent with the tenets of sustainable development. The paper covers some of the ground reviewed above, and in particular it compares the classical model and the emerging sustainable development model of asset valuation. In the classical model, the paper notes that the gap between the book value of a company and its market value is ascribed (broadly) to intangibles – patents, goodwill and sometimes branding. In the sustainable development model, the value of a company is assessed by reference to its ability to handle sustainable development issues. Techniques for managing, measuring and communicating these assets include (among others) social, ethical, environmental and sustainability indices. The paper describes the relationship between sustainable development and intangibles as follows:

> 'The intangibles problem as currently framed within the sustainable development model asks: "What are the connections between the management structures, systems and competencies within an organisation and its contribution to improved social, environmental and economic outcomes?" And perhaps, in addition, what are improved outcomes – what exactly is sustainable development?'

The paper notes that competitive advantage is increasingly explained by (or sought from the exploitation of) intangible assets, such as intellectual, social and human capital, rather than the traditional physical assets. The causes of interest in intangibles are ascribed not only to two issues identified by Lev, that is *intensified business competition* arising from globalisation and deregulation in key sectors like telecommunications and financial services, and the advent of *information and communication technologies* as vehicles for knowledge diffusion, but also to a third factor centred on corporate social responsibility and its focus on stakeholder engagement.

One way to classify intellectual capital is shown in Table 1.

Human capital	Structural capital	Relational capital
Knowledge, skills, experiences and abilities that employees take with them when they leave the firm. Some of this is unique to the individual, some may be generic.	Knowledge that stays with the firm at the end of the working day. It comprises organisational routines, procedures, systems, cultures, databases, and so on.	The resources linked to the external relationships of the firm, with customers, supplers, R&D partners. It comprises that part of the human and structural capital involved with the company'' relations with stakeholders (investors, creditors, customers, suppliers, etc) plus the perceptions they hold about the company.
Examples: innovation capacity, creativity, know-how and previous experience, teamwork capacity, employee flexibility, tolerance for ambiguity, motivation, satisfaction, learning capacity, loyalty, formal training and education.	Examples: organisational flexibility, existence of a knowledge centre, general use of IT, organisational learning capacity.	Examples: image, customer loyalty, customer satisfaction, links with suppliers, negotiating capacity with financial entities, environmental activities, etc.

Table 1 Source: Classification of intellectual capital, from Meritum (2000)

Across society there are other sorts of capital. Aldridge, Halpern and Fitzpatrick (2002) list:

- Physical capital, including plant, machinery and other assets
- Natural capital, including clean air, water and other natural resources
- Human capital, including knowledge, skills and competences
- Social capital - social connections that enable people to act together to pursue shared objectives
- Cultural capital, including familiarity with society's culture and the ability to understand and use language
- Financial capital, used to fund, acquire or invest in other forms of capital.

Citing various authors, they define social capital as

> 'the networks, norms, relationships, values and information sanctions that shape the quantity and co-operative quality of a society's social interactions.'

2 How does all this relate to the built environment

For a number of years, those who are responsible for the design of buildings have been seeking to explore ways to capture, express and perhaps even measure the added value of design. A good deal of architectural history deals implicitly with this issue – historical buildings that we cherish demonstrate attributes that we value while, conversely, much of our building stock remains unloved. Clearly some buildings – perhaps put to similar uses and with similar floor areas – are more valued than others. If we can understand what attributes cause these widely different values we should be able to feed that forward into the design process.

The social and economic value of the built environment

The recently published report by David Pearce for nCRISP (Pearce, 2003) summarising the social and economic value of construction contains a section on the benefits of the built environment. This notes that the nature of the built environments affects human health, social behaviour including crime, and a general sense of social identity including civic pride. The built environment is a major part of man-made capital, but it affects human and social capital as well. Pearce draws attention to studies of::

- Healthcare buildings that help to speed patient recovery, reduce patient abuse of staff and raise staff morale

- Schools with higher levels of capital investment in the physical environment achieving better learning and achievement records, and similar associations have been found between educational performance and per capita floor space and natural lighting
- Commercial properties that have price premia arising from higher architectural standards
- Higher property values and a better sense of social responsibility arising from careful use of land for recreational purposes.
- Increased local income from tourism (and educational achievement) from the integration of cultural features, such as museums and art galleries, into urban and rural developments
- Reductions in the incidence of crime from good neighbourhood design.

He also endorses a paper for nCRISP by Richard Lorch which identified the following benefits from good design: economic productivity, quality of life, health, safety, education, and a sense of identity. Pearce ends his chapter 6 as follows:

> When well designed, the built environment generates large, but as yet unquantified, benefits in terms of human wellbeing. Good design contributes to physical and mental health, to a sense of identity and wellbeing, to good social relationships, reduced crime and to higher productivity. Bad design and delapidation have the opposite effect.' (page 50)

Intangibles at the urban scale

The discussion paper by Aldridge, Halpern and Fitzpatrick (2002) previously cited, includes reference to the contribution of the built environment to social capital, about which they say:

> '… busy transport routes … divide and degrade communities. Urban design can also impact on social capital through affording natural opportunities for social interaction in public and semi-public spaces.' (page 44)

Later they cite proposals from *Saguaro Seminars for rebuilding social capital in the USA*, as calling for reduced urban sprawl and commuting times, pedestrian-friendly design, and availability of public space. They note that urban design is known to have very significant impacts on social networks and, through these, on outcomes such as crime and health. They conclude:

> "Essentially, designs that make social interaction easy, but do not force it, lead to far more positive and extensive social relationships between neighbours, impacting on both bonding and bridging social capital." (page 66).

Other studies of urban design have made similar observations. For example, research undertaken as part of the in the 1995 Department of Environment initiative *Quality in Town and Country* to examine the factors that that contributed to urban design quality, reported by Rowley (1998) states:

> 'While it is easy to cost a development, it is much more difficult to place a value on what are often intangible qualities, all the more so if a particular solution is innovative. So developers are frequently driven back onto a 'gut feeling' although a few claim to be able to measure the returns on investment in design quality. For this reason, persuasive architects and masterplanners can have a significant influence on property developers, helping to convince them of the added value better design may realize even if this involves an increased cost initially.'

Since then, CABE has taken a lead in compiling the evidence about how better urban design adds value (for example, CABE, 2001) and is beginning to identify the attributes that deliver social, economic and environmental benefits. In the case of commercial developments, mixed uses, good connections with neighbouring developments, good transport links, and high quality low maintenance materials all contribute in various ways (Carmona, 2004).

Corporate identity

Pioneering research into the design of bespoke office buildings by Jon Rouse (2004) explored how a number of corporate clients, whose expenditure on their new buildings exceeded the market value, measured architectural value in order to justify additional expenditure. All his case study organisations recognised the corporate benefits arising from architectural investment, representing both tangible benefits of the sort that can be counted by traditional cost/benefit but also intangible benefits that are more difficult to measure. Employee satisfaction was the most highly rated motivation. Corporate policy in architectural investment was also very important; design champions at senior levels within the organisation and corporate precedents for high quality architecture were both found to be significant factors. For seven of the ten organisations, procuring a building was part of a much wider corporate development process – with the goals typically of transforming how the company does business; encouraging creativity, enhancing communication, promoting team work, operating less formally, encouraging flexible working and reducing hierarchy. Rouse found that three of the companies attempted to cost out the benefits from intangibles – corporate identity, company branding, staff recruitment and retention – using known methods. However in four more, formal valuation processes more appropriate to financial reporting than to design, had been used. These had incorporated the costs of the project but failed to take account of the corresponding benefits, particularly the intangibles. He argues that the constraints and restrictions of these methods, which have their roots in company law, accountants' standards and surveying practices, distort the results and that new methods are needed to account for value, and he goes on to suggest that if new methods can be found to demonstrate the benefits of architectural quality and value then additional investment into the built environment can be released.

Office environments

CABE is currently in the process of commissioning a major review of the global literature on productivity so no attempt will be made to cover the same ground here. There are, in any case, many existing reviews (for example, Oseland, 1996; Heerwagen, 1998; Haynes, Matzdorf, Nunnington, Ogunmakin, Pinder and Price, 2000). It is widely accepted that productivity is affected negatively by poor indoor air quality and poor levels of thermal comfort (Wyon, no date). However, as Hertzberg has identified, the converse does not necessarily hold – improving comfort does not raise productivity. Leaman and Bordass (2000) report that the killer variables among those which are under the control of building designers and facilities managers are:

- Personal control (also referred to as adaptive opportunities by others) - the ability to raise or lower blinds, open and close windows and use switches to control services
- Responsiveness – that is the speed of reaction to staff discomfort by facilities managers
- Building depth – deeper buildings tend to reduce satisfaction and productivity, while a depth of around 12m across the building seems about optimal
- Workgroups – perceptions of productivity are higher in smaller and more integrated workgroups.

Education buildings

Schools figure prominently as a sector where there is interest in good design. Feilden (2004) reports:

> "Gradually, research studies are being undertaken, mostly in the USA, but increasingly in Britain, with their findings being collated by the Commission for Architecture and the Built Environment. Positive correlations are claimed between the attributes of the building and pupils' examination results, and between quality of daylighting and progress in reading and maths; improvements of between 20 and 26% going from the worst daylit school to the best are reported (Heschong Mahone Group, 1999). In Britain a team lead by Professor Brian Edwards is investigating the performance of 'green' schools compared with similar schools that do not have these features. Early results imply positive correlation between

> green features and pupil performance, particularly at the primary level, although caution is essential in interpreting the data since it is difficult to ensure comparability among the schools being investigated for factors such as pupil intake and staff capability. Both this research and that undertaken by Price Waterhouse Coopers (2001) on behalf of the DfES show improved staff morale and retention in better facilities."

Recent American work includes *Building Health, High Performance Schools – a review of selected state and local initiatives* (Environmental Law Institute, 2003). The emphasis here, however, is clearly on sustainability and the report lists a range of criteria from the Sustainable Buildings Industry Council, including superior air quality, environmentally responsive site planning, energy efficient building shell, high performance lighting and HVAC, daylighting, renewable energy; life cycle cost analysis, safety and security, and building commissioning. Educational and scholarly achievement is barely mentioned.

Buildings for higher education have also been described as needing to deliver educational benefits. In an article in the Times Higher Educational Supplement (THES, 2002) entitled 'Creative premises you can build on' the president of MIT is quoted as saying their new buildings are intended to create:

> 'an infrastructure for invention that fosters the unfettered cross-fertilisation of ideas.'

The same article comments on the importance of image in a competitive market, and notes that institutions face not only increasing domestic and global competition, but also radical changes in how teaching and research are done. Multi-disciplinary working is increasing, and universities need to provide informal spaces where people can congregate and share ideas. Where once such places were seen as add-ons to core academic space, they are now seen as core themselves.

Healthcare buildings

This is another sector where there is beginning to be a body of evidence built up about the attributes that lead to added value. Pioneering research was taken by Ulrich (1984; no date). His findings are to have identified that

> 'specific factors affect patient outcomes: noise reduction; pleasant music, especially when controllable; windows, particularly in acute care rooms; sunny rooms and views of nature as a priority for critical care patients; and day rooms, lounges and waiting areas furnished with pieces that are easy to move.' (Ulrich, no date)

Lawson (2004) reports on a study which seems to support Ulrich's findings. He shows how privacy, view, environmental comfort and control of the environment are rated as important by patients in a hospital under study, and studies of hospitals at Poole and Brighton where, in each hospital, a comparisons was made between a new ward and an old one, demonstrated that the newer wards led to improvements in quality of life for both patients and staff. He says: 'the improvement in the atmosphere on the wards is likely to rub off on the staff, who may well take less sick leave and show a reduction in turnover and be easier to recruit.' He concedes that his data are inconclusive as yet and a larger study is needed to put a value on the value of design in the healthcare environment, but believes that the savings over the lifetime of the building are likely to be considerable.

3 Tabulating stakeholders and intangible benefits

The following table is an initial attempt to identify the intangible benefits that accrue to particular stakeholders in the built environment. At this point it is almost certainly incomplete, but will be added to as the study proceeds.

	Sector	Beneficiary	Issue	Factor	Consequence to individuals affected	Benefit to the organisation
1.	Various but particularly offices	Operational staff	Temperature Ventilation and fresh air Air movement Daylight Artificial light Good acoustic conditions Views to outside Absence of glare Responsive controls	Individual comfort Conducive workplace	Health Well-being Staff morale Staff goodwill	Optimum staff performance, motivation, and productivity Reduced absenteeism Improved staff retention
2.		Operational staff	Space planning, circulation, on-site facilities	Interactions with other staff	Frequency and circumstances of opportunistic meetings	Improved collaboration, communication, creativity, teamwork, 'team spirit' and innovation Group and friendship formation
3.		Operational staff	'Fun place to work'	Internal and external image	Sense of pride Aesthetics Inspiration Symbolic value Corporate culture	Higher recruitment potential Improved staff retention
4.		Corporations	Demonstration of commitment to innovation	Corporate or brand image externally Corporate identity	Advertising Prestige Reputation	Improved sales Enlarged customer base
5.		Facilities management staff	Achievement of comfortable internal conditions	Responding to reported faults	Fewer interventions	Cost saving

6.	Specific to hospitals	Hospital patients	Thermal comfort Acoustic comfort Views to outside Privacy Perception of cleanliness Reductions in cross-infection	Individual 'comfort'	Fewer drugs Fewer pain-killers Fewer cross-infections	Improved recovery rates Quicker recovery Patient throughput
7.	Specific to retail	Organisation	Appearance, prestige,	Customer experience Customer loyalty	Increased footfall	Higher turnover Increased profits
8.			space planning, pedestrian circulation			
9.	Specific to schools	Pupils	As for row 1	Comfort	Improved health and well-being Better individual educational attainments	Better educational results Reduced truancy Reduced vandalism
10.		Teachers	Space planning	Increased footfall Improved supervision	Reduced truancy	Time and cost savings
11.		Caretakers	Materials	Maintenance	Reduced vandalism	Time and cost savings
12.		Local Authority				Better educational results Reduced maintenance
13.	Public realm	General public		Civic pride	Patterns of neighbourhood behaviour Group and friendship formation Inward investment Reduced crime Reduced vandalism	Urban regeneration
14.	Housing neighbourhoods		Symbolic aspects of the environment	Labelling and reputation of neighbourhoods can affect happiness	Individual perception of achievement and satisfaction	

4 Value management and whole life value

BRE has been responsible for a good deal of work in the area of value management and – more recently - whole life value. Their whole life value website (www.wlv.org.uk) provides a search engine that:

> 'enables designers and their clients to take account of the most significant aspects of sustainability and to predict the 'whole life value' of their projects. The search engine has been developed in a structure that allows the user to narrow their search by entering fields as various search criteria. The range of resources contained within the database to search from include guidance notes, information papers, standard procedures and tools among others. All searches can be carried out via various criteria such as construction life cycle phase, prioritising focus (e.g. social, economic and environmental values), keywords and the type of resource. The search engine is aimed at helping designers to search a large number of resources that have been developed to help them identify and achieve higher levels of sustainability for their clients. The WLV search engine has been populated with tools, guidance and procedures identified during a BRE review of material in the public domain.'

Searching is based around eleven main subjects – air quality, construction process, durability, ecological diversity, emissions, employment, energy consumption, environmental impact, health and safety, material efficiency and community impact. Using the search term 'contingent valuation' for example, identified the website of the School of Construction Management at Salford University. Searching for 'value management' identified just one resource - the Construction Best Practice programme. A search on 'intangibles' resulted in no hits. So far, the WLV website does not appear to enable users to identify new methods for valuing intangible benefits in the built environment, nor provide a means for searching for the sort of intangible benefits on a sector by sector basis that are identified above in section 2.

Value management as a topic is, of course, widely written about and practised as a technique. BRE has published widely including a 38-page comprehensive bibliography of the value management literature by Hayles, Bowles and Gronqvist (1997). Value management is described as:

> '…a strategic approach to achieving maximum value in a project consistent with the organisation's broad business goals. It is a structured team approach to problem solving that can be applied to the objective setting, concept, design and construction stages and the on-going management of buildings. A value management exercise aims to attain optimum value by providing the necessary functions at the least cost without prejudice to specified quality and performance.'

Connaughton and Green (1996) have published a guide for clients, while Male and Kelly (1998) have also produced a good practice framework on value management for clients and practitioners.

The Institute of Value Management (www.ivm.org.uk) has an extensive website in which construction is one of the sectors featured. Box 1 sets out the contents of the IVM's website about value management in construction:

Value Management plays a key role in the construction industries quest for continuous improvement and innovation. This initiative is applied both to the strategic planning of the business, improvement in performance in addition to delivering Best Value.

- The benefits
- How is best value achieved?
- How is value management applied?
- Techniques

The benefits

Value management programmes have assisted in achieving value improvement for major clients such as BP, Retail, British Airways, BAA, Pfizer, Stanhope, and water and rail companies. Substantial improvements have been achieved in the return on investment of capital projects, up to 50% improvement in capital productivity.

How is best value achieved?

The key to delivering Best Value projects for clients in the construction industry is to run a tight ship, with senior management supervision and clear direction. In particular to ensure that project teams have:

- An understanding of the key business needs and success criteria of clients, users and stakeholders;
- A clear performance brief in terms of value objectives;
- The skills needed, and further training if required;
- No areas of uncertainty as to policy issues and expected outcomes;
- An effective team with good communications; and
- The will to eliminate unnecessary costs, and to seek innovative solutions.

How is value management applied?

VM throughout the project lifecycle - Typically, a project will have a planned series of workshops integrated with the project programme beginning at project definition - strategic level, and continuing through to construction- technical level. At the operations stage, lessons learnt workshops and post occupancy evaluation studies assist in improving future projects in addition to the utilisation of the new facility.

Cost cutting Vs value improvement - For many years, value analysis and value engineering was associated with cost cutting, but through applying value methods on projects, it became apparent that Best Value was not about cost cutting, rather improving the understanding of the client's requirements and business needs. This is central to today's VM thinking.

Understanding of client needs - Where there is a poor understanding of client need, or where this is not clearly defined in the client's brief, the result is often poor value throughout the project lifecycle with wasted resource in management time, design time, production time and the cost of change. Securing a clear client brief requires skilled facilitation so that misconceptions on all sides are challenged. Value Management considers the involvement of multi-disciplined users and stakeholders at the earliest strategic and tactical workshops to be of paramount importance.

At the later stages of the project design and implementation, technical value studies still involve stakeholder representation, but, in view of the nature of the topics at the later stages, the multi-disciplined stakeholders are likely to be more technically orientated and focused on implementation.

External 'challenge' - is important to achieving innovation in the construction industry, so for all strategic and tactical workshops, facilitators who are external to the project team are involved. This ensures that there is no undue political or commercial pressure brought to bear on the project team. This also ensures that areas of uncertainty are identified and dealt with. Technically orientated workshops at the detailed design or construction phases are often integrated with the project team meetings and are often facilitated by a member of the team.

Techniques

Function analysis - methods such as FAST diagrams are considered to be very important in successfully breaking existing paradigms. Thinking in terms of 'functions' concentrates on the performance required rather than the traditional solutions. For example, in a major railway station renewal, the function 'enable transfer' placed the emphasis on transfer between lines and reduced the emphasis on access for new passengers. This resulted in increased investment in improving access between the lines and reduced the investment in new ticket halls giving not only a reduction in cost, but also an improvement in use.

Creativity - The construction industry has many consultancy disciplines which often results in compartmentalised thinking. The creativity or speculation stage of the workshop enables cross-disciplined thinking and a more holistic approach to problem solving and more cost-effective solutions, such as the balance between the architectural concept for a building and the mechanical solution for heating and cooling of the building. The end users' value criteria can also lead to solutions which can provide better options in terms of whole life costing, such as the initial cost of providing flexibility for future changes which may never arise compared to the cost of alterations in future when the need arises

Box 1 from the Institute of Value Management website about VM in construction

One of the most important issues on the website is that today's Value Management thinking is about the achievement of Best Value, rather than cost cutting which has long been associated with the value management approach. The website emphasises that understanding client requirements and business needs is now at the heart of the application of value management.

5 Case studies of the use of existing and new methods for establishing business needs and their value

The following table presents nine published case studies illustrating the use of value management methods, cost benefit analysis, balanced scorecard, and attempts to value intangibles.

Case Study Project, Method Used, and Publication Source	**Approach and outcome**
MOD Abbey Wood: incremental cost benefit analysis, in Wyatt (2004)	Incremental design approach to provide the highest quality indoor air and thermal comfort control. Costs and benefits for four options were ascertained: perimeter heating, displacement ventilation, summertime cooling, active static cooling. Costs were worked out conventionally, and benefits calculated using estimates of lost production based on research into productivity and indoor environmental quality by Wyon.
Bristol and West Headquarters: cost benefit analysis and inclusion of intangibles of corporate image and ease of travel for staff, in Wyatt (2004)	Describes how the decision to consolidate staff in a single headquarters building was taken after detailed assessments of workplace occupation costs were carried out. These included energy use comparisons in new and proposed buildings, HVAC maintenance costs, air quality, temperature and flexibility potential in the new building. Ease of travel for staff and corporate image were included in the decision making.
BP Sunbury: costing of environmental benefits, and identification of other means of reducing climate change emissions, in Wyatt (2004)	Comparisons of climate change emissions were taken into account in the decision to develop BP Sunbury. The buildings themselves are designed to be highly efficient, and BP is undertaking further organisational steps to reduce emissions, such as video conferencing, a local bus service from the railway station and video conferencing.
BA Waterside: estimates of intangibles for staff turnover, sick leave, corporate image, productivity, creativity, flexible working, improved morale, in Rouse (2004)	BA's Waterside headquarters brings together its staff from a variety of separate outdated offices into a single headquarters. The development opportunity has been used to drive a corporate change programme based around increased creativity, greater informality, less hierarchy, more flexible working and less paper. Most areas have no permanent desks. Instead there are touchdown points and hot desks, plus quiet areas for more reflective individual work. Estimates were made of the benefits of increased productivity, new ways of working, improved decision-making, improved morale, and lower running costs. On a project budget of £200m, potential savings were calculated at £15m per year: 'This figure was generated on the basis of tangible and intangible benefits having looked at every issue – staff turnover, sick leave, publicity – and we tried to put a numerical value on it.'
Boots D90 Extension: estimates of tangible benefits and life cycle benefits used to justify higher capital cost, in Rouse (2004)	The project was perceived as consolidating many spread out departments into a single site while stimulating a new corporate culture based on greater creativity and more teamwork. A new IT system was introduced at the same time to boost productivity. While the cost was higher than the market value, the company had looked at corporate processes and was found to be operating in silos. The project was part of a culture change programme to promote cross-functional working, greater staff empowerment and stripping out of hierarchies. Tangible benefits and life cycle savings were used to justify higher capital costs.
Capital One European Headquarters, Nottingham: use of balanced scorecard method to evaluate options, in Rouse (2004)	Rapid company growth caused a need for a new building and, after considering the importance of disposability, the company opted for the gains in working environment offered by a single large building. Priority was given to the interior working environment and the creation of a vibrant and flexible workspace intended as a fun place to work for a very young workforce. The design of the building flowed from a corporate strategy. A balanced scorecard method was used to test all decisions to ensure operational excellence.
MOD Sports Complex Aldershot: value management techniques in Trebilcock (2004)	The integrated project team established value criteria using value management methods. The project concept was developed by using value management techniques, incorporating end users' knowledge, and applying specialist contractors' skills. The main outputs from the value management and value engineering exercises were: • Key stakeholder/end user requirements better understood • Significant reduction in client variations • Functionality and value for money achieved • Programme saving • Significant life cycle cost saving by using a combined heat and power (CHP) unit.

Desk-n-chair: value management workshop to explore real, not assumed, business needs, from a BRE web-page entitled Value from Construction, dated 1999	Desk-n-Chair owned a workshop, office and showroom for office furniture in a run down inner city location. Although their product was acknowledged as being of high quality and competitively priced they lost sales whenever a buyer visited. The managing director decided the firm's location was losing orders through a lack of image, and he sought a new location out of town. However, a Value Manager was asked to facilitate a meeting attended by the managing director, the sales director, the works manager, the company accountant and two foremen. The meeting undertook a structured review of the problem, image enhancement was seen to be the solution. During an ideas session one of the foreman suggested that the image problem only referred to the showroom. From this idea came the best value for money solution. The showroom and sales staff moved to rented premises in the central business district of the city. Prospective buyers never visited the workshop. Sales later increased to the extent that the old showroom was demolished to make way for an extended workshop.
Western Housing Association (WHA): value management study including brainstorming to generate options and save costs, from a BRE web-page entitled Value from Construction, dated 1999	Western Housing Association (WHA) purchased 6 acres of inner city land to build 90 houses for rent. The plot was bounded on two sides by main roads and a third side by a stream and its flood plain. All mains services were to be taken across the stream. The initial design showed terraces of single aspect houses with no back garden against the main road as a noise barrier. The stream crossing was by a wide span reinforced concrete bridge estimated to cost £400,000. All services including a pumped sewerage pressure main crossed the bridge in a heated duct. At a VM study the functions of noise reduction and sewerage disposal were studied at length. A brainstorming session generated many options but the solutions adopted were: • Using the reduced level excavation across the site to create a steep sided reinforced earth bank 3.6 m high adjacent to the main roads planted with dense thorn bushes; • Running the stream through a culvert and providing 1.2 m diameter reinforced concrete pipes as flood relief within an embankment crossing the flood plain. This solution also negated the need for a pumped sewerage pressure main as a gravity option was possible; • Redesigning the scheme layout to incorporate all dual aspect houses with back gardens and minimise road and services lengths. By dispensing with the bridge and incorporating these solutions, the saving was estimated at £500,000.

Case study examples of the use of existing and new methods

6 The need for new valuation methods

The studies reviewed above in section 2 are not exhaustive, but they illustrate the growing evidence base about the value of design in particular sectors, and the attributes that lead to improved quality of life for stakeholders from well designed built environments. CABE is currently engaged in collecting and classifying this evidence, and promoting the benefits of good design. But while the evidence base about the potential of design to improve quality of life is being assembled in one place and promoted to the building design community, there remains a barrier to uptake if better design requires additional capital expenditure.

From his study of bespoke corporate buildings, Rouse (2004) argues that buildings are not only fixed assets, but also support the structural capital of a company – such as its competence and creativity – and contribute to its corporate identity and ability to undergo cultural change. They also contribute to issues such as goodwill and staff welfare and retention, and are an aspect of a firm's corporate social responsibility to its stakeholders. He argues that current valuation methods confuse cost with value and that, so long as we lack valuation methods that credit intangibles, crucial investment in the built environment is held back.

Good practice advice for valuing intangible assets of various kinds is beginning to emerge – for example, the RICS Plant and Machinery Faculty report (RICS, 2003). This report includes advice on valuing the location of commercial property. The report notes:

> 'The value of a property comes not only from real estate but also from its location. Location intangible assets are related to the right to use, or restrictions of use, of real estate. A range of intangible influences enhance the value of the property: a specific view;

positioning (e.g. close to an airport to the central business district; address prestige; convenient access; commercial appeal; development potential.'

It adds that all these intangible influences are desirable features of real estate and not IAs by themselves. The report then suggests that a variety of valuation techniques may be used, but lack of available data can restrict certain approaches. Box 2 shows the approaches suggested.

The cost approach

As the valuation of location IAs is largely based upon the income generated by the real estate property rather than the cost of creating and developing its intangible influences, the cost approach is seldom appropriate for the valuation of location IAs. Despite that, the cost approach is useful. It must consider the following components (although some of these may not have value):

- Direct costs – including material, labour and overhead costs related to the real estate property and the costs of getting a permit or easement regarding the location
- Indirect costs – mainly associated with architectural and engineering consulting related to the tangible elements of the real estate and the lawyers and consultants' fees related to obtaining the location intangibles (such as planning permissions)
- Developer's profit – the profit expected from the property development process. Typically it is calculated as a fair rate of return on the direct and indirect costs of the property development process. It must also include the costs associated with the process of getting the permits, leases or other intangibles related to the location IA
- Entrepreneurial incentive – the estimated amount the property owner needs to develop a particular project compared with an alternative development project (ie the opportunity cost). Despite the lower level of risk than when dealing with some other IAs, the entrepreneurial incentive should also consider a component to compensate for the risk of the project failing.

Given the special features of location IAs, the main costs may be in the entrepreneurial profit.

The market approach

You can use two different techniques here. ***[Though the document lists only one.]*** Both based on market-derived empirical data. First, compare transactions of similar IAs to estimate the value of a specific IA. This technique has four steps:

1. An analysis of the risk and expected return characteristics of the location IA
2. A reasonable criterion of comparability is selected for use in the valuation process
3. A comprehensive search for market data regarding the purchase or sale of similar assets should be performed
4. Empirically derived pricing measure (eg, price per square meter) are applied to the location IA to estimate its market value.

The income approach

The more common income approach involves the analysis of incomes (such as rentals,leases and licenses)of comparable assets.This technique follows the same pattern as the market approach,but instead of using data regarding comparable assets,it uses data relating to rental agreements involving similar assets.In simple words,instead of price per square meter,there will be a rent per square meter.As rentals are a stream of income over the useful life of the asset, another key difference is that when using this technique all future cash-flows accruing from the rental stream are discounted to the present moment using an appropriate discount rate.There are three more complex techniques:

•**The capitalisation of incremental income model** – this model computes the additional income that arises from some new right associated with the asset under valuation.An example would be a favourable change in regulations that allows additional floors to be inserted into a building.

•**The capitalisation of the loss of income model** – with this model the value of the IA is the loss of income ((or value) that is caused by the (total or partial)destruction of the IA.An example is the loss of income (or value)resulting from the construction of a building that blocks a pleasant view (that may have been the most important component of the location IA value).

•**The capitalisation of total income less appropriate capital charges** – this model estimates the stream of income that results from the use of the location IA less the costs that the owner needs to incur in order to generate the income.A valid example is the valuation of mining rights.The value of the location IA (mining resources)is the discounted annual amount of net cash flows generated by the mining activity less the (equally discounted)amount of capital investment needed to carry out the mining activity (eg,the costs of capital equipment, roads, shafts etc).

Box 2 From RICS, 2003.

Rouse however, goes much further. He reports that the RICS has acknowledged:

> 'As a profession, we are facing a whole new set of intangibles, design value being only one. Valuers are going to place a premium on particular buildings. Frankly the surveying profession does not have a clue how to measure those values at present.'

He notes there are a number of new methods that are being explored by the research community, and identifies some examples that have potential in the built environment.

The fields of environmental economics and ecological economics have begun exploring and developing new methods for valuing environmental benefits and ecological resources – see for example Turner, Pearce and Bateman (1994) and Edwards-Jones, Davies and Hussain (2000). The latter authors identify and classify the following techniques: productivity change, opportunity cost, dose-response, preventative expenditures, shadow projects, substitute costs, cost effectiveness, travel cost method, wage differential, hedonic pricing, artificial market, contingent valuation, multi-criteria analysis, delphi techniques, environmental impact assessment, and linear programme. After reviewing these methods, we have selected three that seem to offer the greatest potential for further exploration:

Hedonic pricing	These methods seek to isolate the contribution that environmental quality makes to the total value of an asset. Example: data are collected for a large number of houses and statistical techniques are used to isolate the variations in purchase price that come about as a result of environmental factors while holding standardized factors for all other characteristics constant. The proportion of the price differential between two otherwise identical houses accounted for by the change in the environmental quality characteristic reveals an individual purchaser's valuation of the importance of environmental quality.
Contingent valuation method	Estimates environmental values by asking people to state what they are willing to pay for an environmental benefit or what they are willing to accept in compensation for a loss. The method suffers from a number of well-known problems, which, however can often be designed out by careful survey design. The level of information about the environmental good under consideration given to the respondent can be important.
Choice experiments	Seeks to discover the contribution of different characteristics of a good towards its overall value. Hypothetical scenarios are prepared in which different combinations of characteristics of a 'composite good' are prepared, and respondents are asked to make pairwise comparisons between different scenarios. After a number of responses, it is possible to isolate the effects that individual characteristics have on preferences. Used in consumer marketing to identify the importance of various characteristics of new products for consumers and their willingness to pay for them. Suffers from the weakness of being reductionist – decomposition of overall value into part-worth of component strands ignores the notion of value being a holistic concept not meaningful reducible to a set of constituent parts.

After Edwards-Jones, Davies and Hussain (2000).

7 Conclusions

This review has explored a wide range of issues concerned with the valuation of intangibles. Our research objective is to identify valuation methods that help to give credit to intangibles in the built environment. The overall aim is to ensure that the intangible benefits associated with good design can be appropriately valued, so as to release investment into the built environment.
Environmental economics is one of the fields where new methods are being explored. Three methods have been identified from the environmental economics literature that seem to have the greatest potential and will be subjected to further investigation:

- Hedonic pricing
- Contingent valuation
- Choice experiments

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