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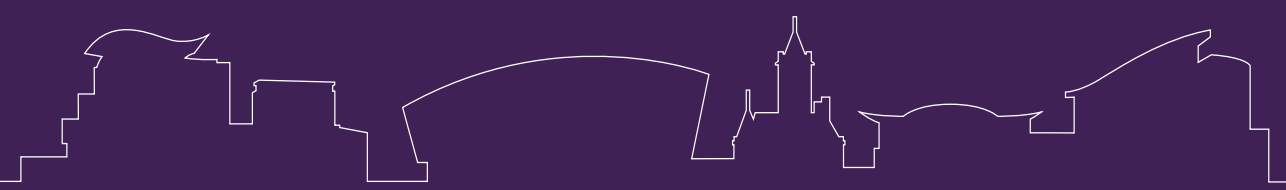
CONSTRUCTING EXCELLENCE IN WALES

Be Valuable

October 2015



Preface

In the ten years since Constructing Excellence published Richard Saxon's report 'Be Valuable: a guide to creating value in the built environment', its ideas have made progress. More clients, both public and private, are making investment decisions based on social and environmental benefits as well as economic performance. Constructing Excellence's programme of exemplar projects demonstrates what can be gained from a focus on value-based outcomes.

But there is a long way to go. Too often the business case for a construction proposal fails to provide clear awareness of how the project will create value for stakeholders, the Welsh economy and local communities. Whole-life costs are still overlooked at the planning and design stage. More effort is needed to capture learning about what works from in-use appraisal.

Many barriers remain to value-based thinking. This second edition of Be Valuable updates the message, providing examples and guidance that will help all stakeholders to create and enjoy better value from investment in the built environment.

Chapter 1

Executive summary

The built environment accounts for around 15% of GDP and is a key driver for the rest of the economy. It covers building and infrastructure for the public and private sectors and the disciplines supporting it: property investment, project and cost management, design, construction, and facility and asset management.

Traditionally, the sector has sought profit by striving to minimise cost rather than maximise value. This report explains the concept of value and how it depends on the viewpoint of the stakeholder. It suggests ways to create social, environmental and economic value in projects, producing wider benefits and reducing whole-life costs.

'Value is created on the drawing board, not the site,' said Paul Morrell, first Chief Construction Adviser to the UK government. The report demonstrates the truth of this by analysing the ratios between construction cost, whole-life cost and value generated by the occupier. It explains how outcome value is linked to the earliest stages of planning and design.

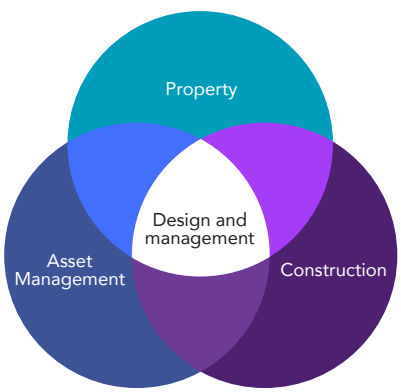
The report considers how the arrival of Building Information Modelling (BIM) and its associated working methods greatly assist the quest for better value. It shows how value can continuously be improved by capturing vital feedback about what works and what doesn't. And it restates the case for collaborative ways of working as a means of delivering the benefits that will reward stakeholders, improve the quality of life and lead to a better built environment.

Chapter 2

Making value our central focus

Our built environment is the legacy of buildings, spaces and infrastructure created by ourselves and our predecessors. It represents 77% of national fixed assets, and it costs us significantly to operate and maintain. That nexus of property, construction and asset management accounts for about 15% of the economy and employment, and enables everything we do by providing places to live, work and play.

Yet, with a few splendid exceptions, most of the built environment is disappointing. It underperforms, pollutes, costs too much to run, is in short supply or fails to inspire. In short, it is not as valuable as it should be.



Traditionally, cost has been regarded as the best way to measure the worth of investment in a building. Clients tend to set budgets that reflect available funds rather than potential value, and design and construction teams are too often chosen on the basis of the lowest tender. The result is one of the most expensive building processes in the developed world, producing low-value products which often arrive late and over budget. The construction industry, vast though it is, is barely profitable and lacks the resources to invest in research and innovation.

How do we break the circle of low expectations and achievement? The answer lies in rethinking our approach to commissioning construction projects. If we focus on value, we may find that we can afford better buildings at lower cost. That requires careful consideration of what we want from our built environment and how best to achieve it.

When it comes to productivity and innovation, construction is a relatively backward sector. A generation after the manufacturing industry switched to 'lean' processes and automation, construction remains a craft-based sector producing one-offs. Since 1990, productivity in manufacturing has risen hugely while in construction it has essentially remained unchanged. Construction costs rise faster than

"A successful project is one that provides a desirable outcome for all, with enhanced benefits for the surrounding community"

retail prices as there is no productivity gain to offset the burgeoning input costs of labour and materials. Demand from the rapidly urbanising world ensures that material prices will keep rising.

The gap between manufacturing and construction productivity can be illustrated by comparing the cost of building a space in a parking garage with the cost of a car to park in it.

The cost of the space now exceeds the average price paid for a new car. Lean manufacturing allows the cost of cars to be cut even as the vehicles themselves become smarter. It's not about mass production so much as the new model development process that concentrates on what customers value most. Construction costs, on the other hand, tend to be controlled by dumbing buildings down.

Value is a subjective thing. All stakeholders in a construction project, whether it's the owner, funder, occupier, user or facility manager, will have their own ideas about what they want from the finished product. A successful project is one that provides a desirable outcome for all, with enhanced benefits for the surrounding community. A value-based approach first seeks to define those requirements, then considers how to deliver the desired outcome through the design, construction and operation processes.

Chapter 3

What do we mean by value?

Human beings convert natural capital, such as sites, energy and material, into human and social capital, not just to meet our immediate needs but also to serve our political and cultural ends. In doing so we gain benefits but also incur costs. The balance of benefits and costs defines what we call value – value is what remains after the costs have been accounted for. In a construction project, costs and benefits take many forms.

Following the launch of the first Be Valuable report, the Commission for Architecture and the Built Environment (CABE) published research on how the built environment and the public realm create or destroy value for society. It defines six aspects of value:

Use value
How the asset supports its occupier's business activities.

Exchange value
What the market would pay for it.

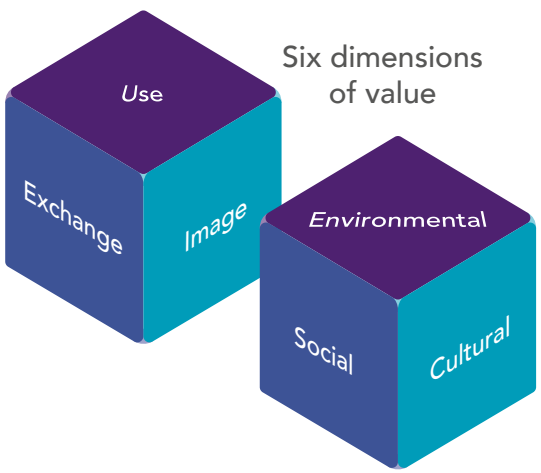
Image value
What it communicates about its owners, users and occupiers.

Environmental value
The balance between its negative and positive impact on the natural environment.

Social value
Its impact on occupants and users and the benefits it brings to the local community.

Cultural value
The extent to which it supports or enriches cultural life.

These six dimensions of value should not be treated as separate issues. They are aspects of a whole – six ways of reading the complete proposition. Represented as a cube, it can be seen that three sides account for broadly tangible, economic factors: use, exchange and image value. The other three represent the less tangible factors: environmental, social and cultural value. The two halves feed into and interact with each other.



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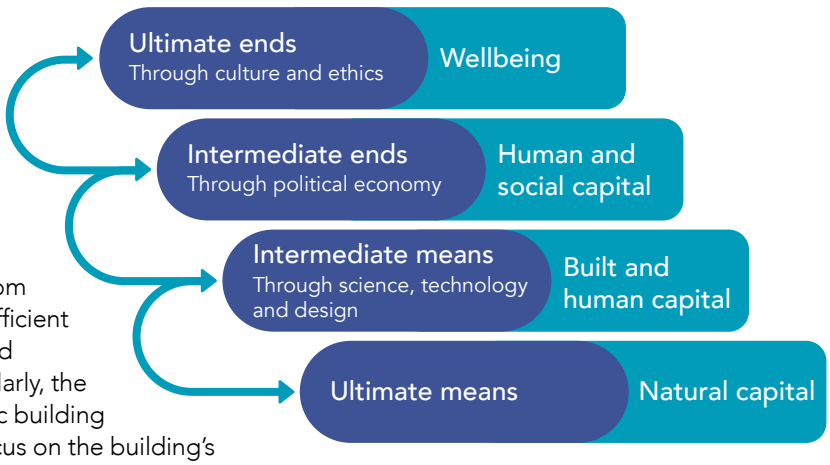
Use value tends to dominate the minds of occupier clients. Functionality takes high priority. When a manufacturer like BAE Systems builds a factory, what matters most is not the build cost but the ability of the facility to support product



delivery. Value derives from speed of manufacture, efficient production processes and minimal cost in use. Similarly, the business case for a public building such as a hospital will focus on the building's ability to support the delivery of good quality care for large numbers of people.

Exchange value is particularly important for commercial clients. The market value of a completed office building, shopping centre or industrial asset depends on factors such as local demand for space, desirability of location and quality of design and fit-out. Commercial clients will demand a specification that maximises the net-lettable space in the building and is most likely to attract tenants.

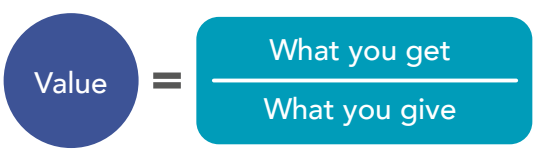
Image value is concerned with what a building says about the people who built it, own it and occupy it. All buildings do this, although some clients are reluctant to admit it. Appearance, design and fit-out all send a message: to the world about the owner's prestige and status; to staff about their value to their employers; and to users and the public about their value to the organisations serving them. Image is crucial to attracting or repelling tenants, and therefore feeds into exchange value. CABE showed how well-designed higher education buildings are a key factor in recruiting high-quality staff, benefiting students by raising educational standards.

Environmental value is the balance of positive and negative impacts. A new building may improve a derelict site and act as a catalyst for recycling, but it will probably also emit carbon and increase demand for water. Planning and building control processes try to minimise negative impacts and promote positive ones, as environmental considerations have traditionally been excluded from project balance sheets. Nowadays, with the rise of corporate social responsibility and the sustainability agenda, clients, developers and occupiers are more sensitive about their environmental credentials. Low-rated space will become increasingly harder to let. Image value, environmental value and exchange value are therefore interrelated.

Social value is also a balance of impacts, relating to the experience of those working in, using or simply living near the building. What does it add to the community? Is it an asset or a liability? A pleasing design (image value), excellent sustainability features (environmental value) and facilities accessible to the public will all increase social value. A building that casts a big shadow, funnels high winds and offends the eye will score low. Projects that revive deprived areas or provide training, local jobs and educational opportunities will also accumulate social value.

Cultural value is provided not just by obviously cultural buildings such as museums and theatres, but by all buildings that conserve heritage, have a strong architectural character or feature public art. Cultural value is part of image value and also, potentially, of exchange value – particularly if the asset attracts tourism.

Most projects will encompass several different aspects of value, but these will not be of equal concern to all the stakeholders. What is important to one stakeholder will not be a priority for another. The politics of the relationships between stakeholders are always an issue. Paying clients may feel their values should dominate, but they may not get full value on their own terms unless they accommodate the requirements of other stakeholders. Arts promoters may need to ensure exchange value to support the project budget. Corporate developers will need to prioritise social and environmental value to get the necessary permissions. Educational proposals might focus on image value to attract donors.



Heads of the Valleys road dualling. This was designed to provide significant social value, opening up opportunities for people in a deprived area as well as support economic growth. The project has engaged the local community, providing training and jobs, and is also an environmental exemplar.

Llandough Adult Mental Health Unit, Cardiff. The unit delivers use value through positive patient outcomes and increased staff satisfaction. The location on the site of University Hospital Llandough guarantees exchange value, and the project is environmentally progressive and socially beneficial, providing a new community hub.

Penarth Learning Community, Vale of Glamorgan. The facility succeeds in providing the social value intended, but its BREEAM Excellent design also delivers high environmental value through sustainable features such as a pool heated by combined heat and power. Use of the Soft Landings process ensured the completed building worked as intended, and electronic sensors continue to monitor environmental performance.

Welsh Assembly, Cardiff Bay. The Richard Rogers-designed building has high image value. A model of openness and accessibility, it makes extensive use of traditional Welsh materials while its prominent location and iconic form are designed to stir national pride. Its environmental performance is also exemplary.

Cardiff Library. This learning resource and hub of community activity provides strong cultural value. Funding was underpinned by the exchange value of the adjoining St David's Centre, and the award-winning design also scores highly on environment and image.

BAE Systems, Broughton. This flagship 'factory of the future' focuses on use value, its design centred on supporting the business of building wings for airliners. As a project it also hit all its targets for safety, quality, cost, delivery and people factors. The factory's use of renewable energy achieved a 47.5% reduction in carbon emissions over what the regulations require.

Chapter 4

The ratio between costs and benefits

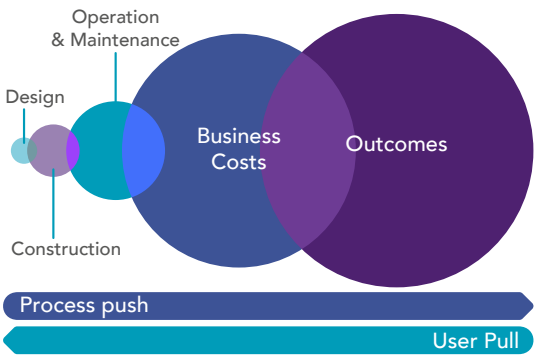
The prime focus for occupiers of both public sector and commercial buildings is making certain they secure value from their respective space – i.e. obtain use value. There are two key questions: how effective could my operation be in this space? And what will it cost me?

But, what few clients and developers appreciate when they are setting budgets is the extent to which the decisions made at planning and design stage will impact on the potential whole-life use value.

Where the CapEx (capital expense) of an asset may be taken as 100 units, the whole-life OpEx (operating expense) will be greater. Even over 20 years the operating and maintenance cost of a building can be several times the capital cost, if not of its rental equivalent. Rates, utilities, security, catering, cleaning, management, upgrading and refitting, all mount up. The business or public service that occupies the space will however try to limit the total cost of space to an order of magnitude less than their business costs. Salaries will typically be the dominant expense. So if whole-life Opex is 300 (say three times capex), then whole life BusEx (business expense) might be 3000.

But this is not the value added by the occupier. That will be higher again.

Most businesses will seek margins over all costs of between 10% and 20%, even more in some industries. A social enterprise will aim to meet its business case for the project, delivering an enhanced service level or serving an expanded population. This will be social value well above cost. However, whole-life cost models should be made with care. Sometimes the effective life of an investment before it becomes obsolete can



be as little as two years for a boutique fit-out or ten years for a hospital imaging suite.

The use of medical buildings is simple to appraise as excellent records are kept of expenses and outcomes. There is also good research on the effectiveness of buildings in supporting service delivery. A study of the comparative performance in old and new facilities showed that the savings from shorter patient stays and fewer Class A drugs needed was greater than the extra cost of the new facility. In other words, patient outcomes paid for the building (see box) in monetary terms. The social value delivered to patients and healthcare staff was far greater in terms of quality of experience and reduced stress – the use value was positive. It is worth noting that French hospitals are designed to perform well on outcomes, with single rooms for most patients – their respective use value is positive. Office occupiers gain productivity increase in

> "Value is created on the drawing board, not the site"
>
> Paul Morrell

the right kind of space, properly equipped. They attract better staff and retain them for longer. Retailers get the most footfall from well-designed shopping layouts, technological capability and quality of ambience. Laboratory occupiers get more new ideas from a building that mixes staff productively and gives them the equipment they need. Warehouse operations can use the latest technology in facilities which support today's logistics. Indeed, ability to deploy the latest technology is often the reason to build or move. National productivity rises with each technological generation and buildings need to change to support this. All of this must be considered by clients and developers at the planning and design stage.

Let's look at the ratio again and turn to the 100 which constitutes the Capex of a building, which results from to an investment in design and management of about one tenth as much: 10. Consider the statement made by Paul Morrell, the Government's first Chief Construction Adviser: "Value is created on the drawing board, not the site"

What he meant is that the act of defining what to build, and getting permission for it, is the value-creating act. Delivering the facility is of course a major task but it is often a struggle to deliver what was designed. Quality that delivers value is lost through dysfunction in procurement, downgrading of specification, poor workmanship and weak commissioning and operation. Few buildings deliver fully what they promised. Within the cost of professional services however is the core process of making the business case, developing the brief and proving feasibility, and setting up the project. These activities cost less than 1 in the ratio set but can add use value to the occupier whose output value is thousands of times greater. The absence of focus on value in most of construction comes from not appreciating these ratios. Clients who stint on the initial stages multiply their loss of value down the line. The best way to maximise value, and to minimise outturn cost, is to invest properly in Stages Zero and One of the RIBA Plan of Work (see chapter 5). The built asset consultancy EC Harris captures the value-defining sequence of work as:

1. **Define the asset that will maximise delivered value**
2. **Minimise the operating budget while supporting 1**
3. **Minimise the capital budget while supporting 1 and 2**
4. **Select how best the asset will be held**

This last item reflects options including ownership, leasing, or receiving the facility as a service.

The long-term separation of thinking and accounting between capital and operating costs is now breaking down as businesses and government recognise that it misleads decision makers and weakens value-seeking.

Chapter 5

Defining and delivering value

The extraction of value from an asset is much better understood today than in 2005 when the first Be Valuable report was published. But given the impact of the recent recession, it's worth restating certain key lessons and guidelines.

- At the start of every project, clients must be clear about the value they expect from the outcome. This is essential to create a meaningful business case.
- Clients must take a holistic view of costs, embracing capital expenditure, operating expenditure and business costs, to set against the value of the intended outcome.
- Budgets should be realistic, based on a clear understanding of the intended outcome and the likely business costs.
- Bidding teams should be asked how they will grow the desired value outcomes and minimise the capital and operating costs.
- Suppliers should build up their evidence base, using case studies to demonstrate how they create value.
- Clients should assess the completed asset against the original business case to see if their requirements have been met. Lessons and feedback should be shared.

Since 2005 major strides have been made to improve the design and construction process in the UK and achieve better value from built assets. The UK government's Construction Strategy promotes integration, efficiency and sustainability in construction projects. RIBA's Plan of Work 2013 supports this approach, setting out an eight-stage circular process from making the business case to providing in-use learning feedback to improve future projects. The rise of Building Information Modelling (BIM) is driving better communication and more efficient ways of working. But these developments will only work if clients and the industry are willing to change their traditional cultures and old ways of thinking.

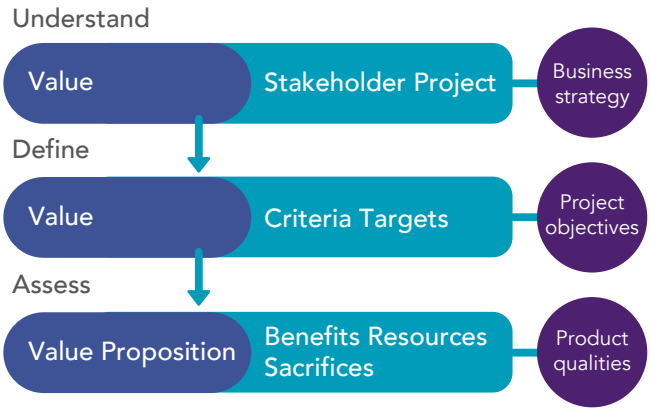
How BIM helps to deliver value

The UK government requires the public sector to be using Level 2 BIM by 2016. BIM supports the delivery of value in several ways.

To work effectively, BIM requires a detailed brief produced with the involvement of all stakeholders, resulting in a clear value proposition. A toolkit for planning the work has been launched online, easily accessible to all team members and enabling efficient coordination of tasks. A protocol has been devised enabling clients to provide their team with all the instructions they need for BIM, including the management of information. Product manufacturers are starting to issue their catalogues in BIM format to help specifiers download the construction and operation information they need.

BIM calls for the kind of progressive practices long championed by the Welsh Government, including early contractor involvement, integrated teams and collaborative ways of working. BIM data supports Soft Landings, the process designed to smooth the transition from

construction to occupation. Over the next 10 years there are plans to exploit digital technology to improve our understanding of how buildings work and ensure they offer more value to clients and occupiers.



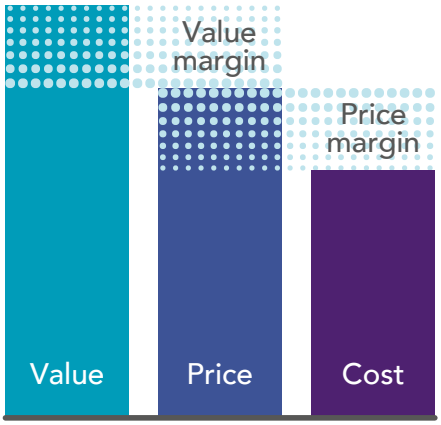
Already, completed projects are demonstrating the benefits of BIM, not just in cutting costs and time but by increasing use value. A young offenders unit in south-east England, for example, was built using 3D imaging to clarify the concept to stakeholders and help ensure the design was tailored to need. The process created a single central resource of essential data for use throughout the building's lifecycle, and resulted in an information library of components for use in future Ministry of Justice projects.

It is essential that all project outcomes are studied with a view to discovering what works and what doesn't. In-use feedback, while often difficult to obtain, is particularly important and should be made easier by the availability of low-cost sensors. Just as the modern jet engine 'talks' continuously to its makers and is optimised in flight, so we need our buildings to tell us how to improve them. Use of leased equipment is worth considering: manufacturers have an incentive to improve the lifetime performance of their products, and to recover the materials when the product is replaced.

All of this proves that costs do not necessarily have to rise to achieve better value. Often it is about improving processes. The Lean process introduced by Toyota and rapidly copied by other carmakers puts the emphasis on what is valued by the customer. Creating a new model begins with identifying what customers want and what it is worth to them. The design and production process is then stripped of anything that does not add value. The price tag sits between the value perceived by the customer and the cost of production. Clear margins are created in terms of value for the customer and profit to the manufacturer.

Out of this approach has come the standardisation of parts, allowing more models to be created from the 'parts bin' to satisfy niche demand. Build-to-order is increasing. This could work for buildings, too. A pool of elements could be created and used for constructing standard types of building, or unique buildings making use of some standard parts. These elements could be produced to high factory standards offsite, saving time and improving safety on site.

A stronger focus on value has the potential to transform our built environment, boost the economy and deliver countless spin-off benefits. Healthier homes save visits to the doctor. Attractive, convenient workplaces increase productivity and business performance. Well-planned public spaces and amenities promote wellbeing and support community life. Sustainable buildings are cheaper to run and help protect the environment. It's simply a question of designing and delivering a built environment based on need, not lowest cost.



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