



Rethinking Standards In Construction

Can standards support industry performance improvement?

Report of a strategic workshop to initiate a new approach to UK standardisation

May 2006

Introduction

There are currently over 3500 standards relevant to construction activity in the UK, but few companies in the construction sector would automatically see them as drivers of business performance or as sources of best-practice advice. Many small firms are often unaware that they even exist whilst larger firms struggle to keep up with the sheer volume of European and International standards which are issued every year.

To address these issues, the DTI has sponsored a series of workshops and an associated research programme as a joint initiative between Constructing Excellence and BSI, with the objective of setting a new agenda for construction standardisation in the UK. The programme is intended to provoke a pan-industry debate on how to make standards more relevant to user requirements, and to act as a catalyst for the development of a new generation of performance-related standards which will improve innovation and competitiveness in the UK and overseas.

The programme began with a high-level strategic workshop on the 16th May 2006, where the main focus was on establishing what drives value in the construction sector, and how standards could support improved value delivery for all stakeholders. The workshop went on to consider what impact this new approach might have on standard-making, and how best to overcome any perceived barriers to progress.

Context

The need for standards is not disputed. The majority of the industry recognises and accepts the need for the highest possible safety requirements, better skills and training and the adoption of best practice, environmentally-conscious processes and procedures throughout the supply chain, and design and construction process.

What is less well understood is how improved performance in all these areas directly drives improvements in shareholder value, customer perception and competitive advantage; or how to implement the data-driven benchmarking approaches that are needed to support the step-change targets that must be achieved if the UK construction industry is to thrive and prosper.

By linking standards to core company and industry issues it is hoped that future standards will be developed that assist and contribute to improved performance throughout the built environment sector.



"Most construction organisations perceive standards as an inevitable (and often costly) area of compliance. We believe that a new approach is needed to both simplify and clarify what standards could do for construction firms and the built environment. Key to this process is linking standards to agreed industry performance measures."

Bob White, CEO, Constructing Excellence

"..standards contributed to c.13% of the growth in labour productivity in the UK over the period 1948-2002."

The Empirical Economics of Standards (DTI, 2005)

Professions

Bob White, Chairman, Mace & Constructing Excellence

John Worthington, Founder, DEGW

Nick Terry, Chairman, BDP

Terry Hill, Chairman, Arup

Dr John Roberts, Board Director, Jacobs Babbie & IStructE

John Reyers, Director, Sanderson Weatherall (representing RICS)

Andy Green, Director, Faithfull & Gould

Strategic Working Group

About Construction Industry KPIs

The first set of KPIs was published in 1999 in response to the Egan report, *Rethinking Construction*, and had three main objectives:

1. to provide companies and projects with a simple method of establishing a performance measurement system
2. to provide organisations with a straightforward method of benchmarking their performance against others in the construction industry
3. to track long term trends in performance, and specifically, to demonstrate whether the construction industry was achieving the targets set out in *Rethinking Construction*.

The KPIs enable clients and suppliers to easily set up a performance measurement system which can be used to benchmark their performance against the rest of the industry. This information can then be used to set individual company performance improvement targets and actions.

Cumulative statistics are collected nationally on KPI-driven achievements, and some headline improvements that have been delivered between 1999-2004 include:

- Predictability of design costs – 55% of projects on target in 2004 compared to 27% in 1999
- Predictability of construction time - 60% of projects on target in 2004 compared to 34% in 1999
- Profitability - median profit before tax was 7.5% in 2004 compared to 3.2% in 1999

Strategic Workshop Objectives & Scope

The strategic workshop on the 16th May set out to:

- achieve consensus on the drivers of value in construction
- agree a new strategic and cost-effective approach to construction standardisation which supports competitiveness and innovation
- identify key players and influencers
- identify barriers to cooperation and suggest solutions
- agree a work plan and deliverables

Ground rules were set to discuss:

- how and why the construction industry must change its practices and processes in order to improve performance;
- the sector's value agenda
- tackling the complexity and fragmentation of construction;
- ways of measuring performance and the role of key performance indicators (KPIs);
- how standards can add value.

A key output from this initial event was an agreement to convene a series of smaller, themed workshops, which will focus in more detail on specific industry issues, KPIs and standards for selected areas of construction. The themes of these workshops will be standards requirements for the:

- Residential sector
- Commercial and Industrial sector
- Infrastructure, Health and Education sector
- Construction Products
- Building Processes
- Water sector

Following these workshops, the conclusions of the research programme will be made available to the industry in the form of an executive report, the launch of which will signal the beginning of a new strategic approach to construction standardisation in the UK.

Industry

Richard Ogden, Chairman, BuildOffsite

John Tebbit, Industry Affairs Director,

Construction Products Association

Peter Anderson, Project Director, Balfour Beatty

Michael Finlay, Managing Director, PA Finlay

Steve McGuckin, Development Director, Land Securities

Standards bodies

Sandy Mackay, Director, BRE

Shirley Bailey Wood, Operations Director, BSI

Carolyn White, Head of Construction Market Development, BSI

Dr Paul Stollard, Chief Executive, Scottish Building Standards Agency

Government

John Brumwell, Construction Sector Unit, DTI

Ian Harrison, Director, Innovation Diffusion, DTI

Tariq Nawaz, Building Standards, DCLG

David Adamson, Smarter Construction Director, OGC

Phil Heenan, Policy Team Leader, Smarter Construction OGC

What Drives Value In Construction?

The general consensus from a number of industry reports produced over the last ten years is that to improve value delivery the sector needs to:

- Adopt a broader, whole-life approach to evaluating the risks, costs and benefits from building projects, rather than focus purely on short-term profit and loss issues
- Focus on sustainability at all stages in the design, construction and long-term use and maintenance of buildings.
- Commit to measurable performance targets in order to deliver improvements across the industry and in specific organisations
- Work towards integrated supply chains at all stages in the building process in order to reduce waste and inefficiency.
- Change procurement practices in order to embed whole-life, sustainable, integrated and measurable ways of working into contractual arrangements.
- Minimise accidents and improve performance by investing in better supervisory training and working conditions



What do we mean by 'value'?

Value is always a subjective issue. A recent report, Constructing Excellence's *Be Valuable (2005)* explores what it might mean for different construction industry stakeholders.

The report defines the built environment as all managed space and infrastructure available for public and private use, encompassing all aspects of property investment and development, design, construction and facilities management. The tradition across this complex of industries has been to manage for cost minimisation rather than for value optimisation. Optimising value, the product of benefits sought over sacrifices required, is a far more rewarding strategy for all stakeholders.

The report suggests that built environments be seen as working assets rather than as physical artefacts. The amount spent on buildings, in initial capital and in use, is small compared to the value added by their occupants. The focus should be on enabling occupier performance and minimising whole life costs. The ratios between initial cost, lifetime facility management cost and lifetime occupant value added are instructive.

In order to understand the impact of this approach, the report first introduces the VALiD framework, a tool for defining project value propositions developed by Constructing Excellence and Loughborough University through facilitated workshops of representative people across the customer-supplier chain.

"In construction, value is about adding and enhancing customer requirements and need"

Secondly, the report reassesses a paper by the Royal Academy of Engineering entitled, 'The Long Term Cost of Owning and Using Buildings' (1998) which first developed the 1:5:200 model where:

Construction costs = **1**

Rent, maintenance and building operating costs (20 years) = **5**

Staff salaries, business operating costs (20 years) = **200**.

"..buildings are the conduits by which [we can] improve the value of a clients' business and the services they provide."

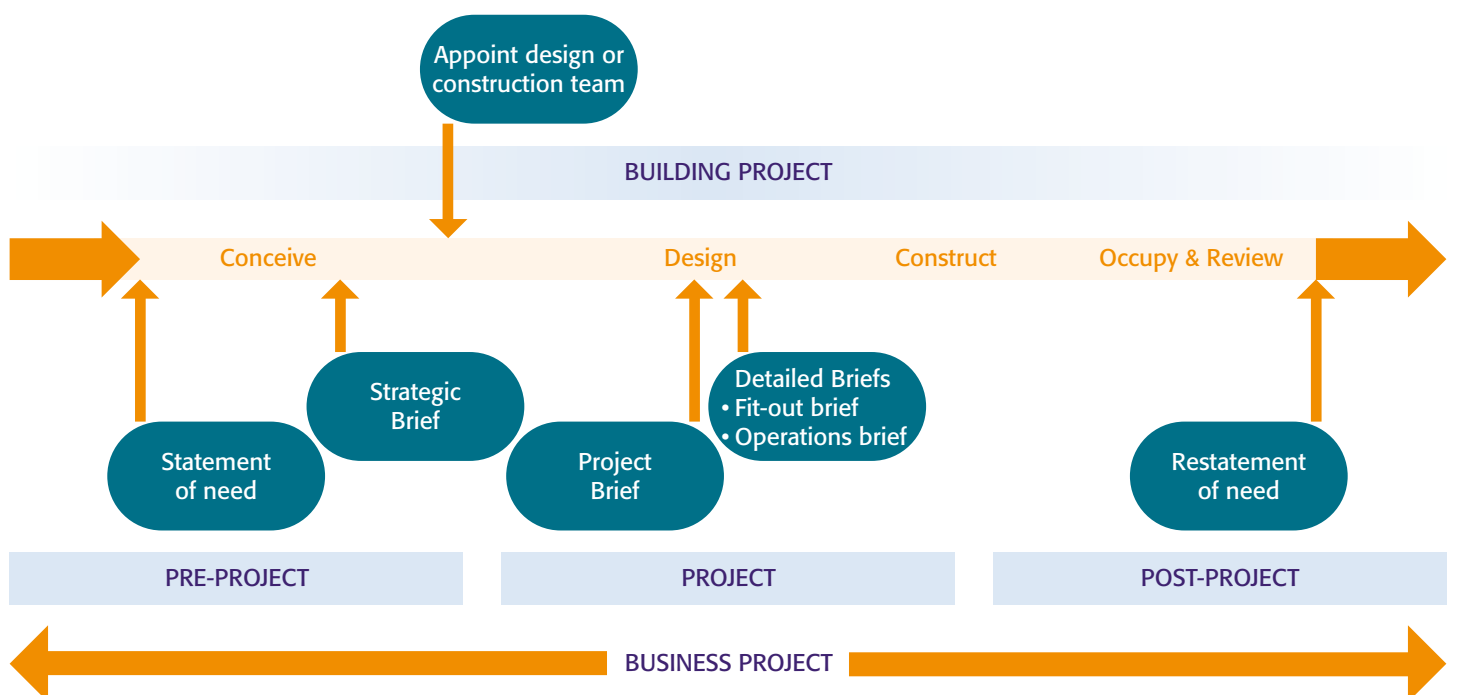
Based on current data, the *BE Valuable* report re-estimates this model for offices as 1:3:300, reflecting on the one hand a reduced cost of owning and using a building, but on the other hand the increased salary costs of the people who work in it.

From a whole life perspective, this definition of value shows the importance of designing and constructing not only to minimise building occupation costs, but more importantly to maximise the efficiency of the most expensive assets in it – the staff. It is still rare for either clients or contractors to factor in these considerations when setting project budgets.

What drives value in construction?

The second presentation at the 16th May workshop outlined four propositions concerning what drives value in construction. They were:

- The value of construction is in matching client expectations and supporting the success of business throughout the lifetime of a project (see figure)
- Value is not finite but depends on the contexts and values of the consumer
- Value is achieved through continuous improvement
- The construction industry is changing to be as concerned with outcomes (process) as with outputs (products)



Group discussion

After the formal presentations at the workshop, the strategy group were asked to evaluate what they felt from their perspective created value in construction. Two different views emerged:

- Value defined from the client business perspective
- Value defined from the internal contractor perspective

What drives value from a client business perspective?

- The property needs of the clients' business: are they a developer, owner operator, maintainer
- What adds value to the clients' business
- How the client defines quality
- Satisfying competing value drivers – how to get the balance right between cost, time, quality + wider sustainability issues
- Understanding client perceptions of success and value
- Achieving lower running costs in the completed building
- Financial performance of a project
- Exceeding clients and end users' expectations: the outcome of the process
- Awareness of through-life costs
- Welding together teams of designers, constructors and suppliers who can work again as a team for same client, or another client

What drives value from an internal contractor perspective?

- Exceeding the clients expectations, causing minimal grief, leading to repeat business
- Continuous improvement
- Satisfying competing value drivers - and getting the balance right between cost, time, quality + wider sustainability issues
- ROI
- Completing on time and on budget
- Providing the best possible solution to a client's brief
- Using standards to enhance process value
- Clarifying customer project objectives and defining performance criteria for success
- Achieving safety for employees, clients and wider community
- Ensuring customers feel in control over process/decisions

Next, the group were asked to brainstorm the most appropriate measures of performance in construction, and to suggest ways in which performance could be monitored. The top ten measures which emerged, and the best methods of tracking them were:

Measure	Tracker
Quality	<ul style="list-style-type: none"> • Level of rework • zero defects
Productivity	Output indicators
Predictability -both time and cost	<ul style="list-style-type: none"> • On time, on budget and defect free • Quantitative cost and time measurements (e.g. based on size of building) • reduction of time taken on site • reduction of cost over time • quantitative cost and time measures
Market price of property	Price indices
Better retention	Turnover of occupancy
Cost of utilities	Contracts
Reduced waste	Level of waste
Number of type of disputes	Litigation costs
Staff satisfaction - staff recruitment and retention	<ul style="list-style-type: none"> • employee satisfaction • staff churn • reduction in sick leave
Rental value	Rental indices

The group were next asked to consider the best use of KPIs in improving value creation with the top ten recommendations focusing on:

1. Mission critical success factors including hard measures on input & output coupled with soft measures on perception/feel
2. Business improvement
3. Productivity in the building
4. The positive and negative impacts of the building on the people in it.
5. Providing clear criteria for success
6. Stress
7. Team work effectiveness
8. Formal surveys of client before and after the project
9. Quantitative cost and time measurements (eg based on size of building)
10. What makes a good employer with "good" facilities

Standards In Construction

BSI and the construction sector

The national standards body BSI has over 25,000 standards in its current catalogue and has a strong position in the construction sector with over 3,500 construction standards and associated services. These include: 417 references to BSI standards in the Building Regulations; 294 European Construction Product Directives; product testing for CE and Kitemark and certification of management systems such as ISO 9000.

Making standards more relevant to the construction sector will encourage their use and accelerate change. The challenge is to align standards with key issues that concern the sector.

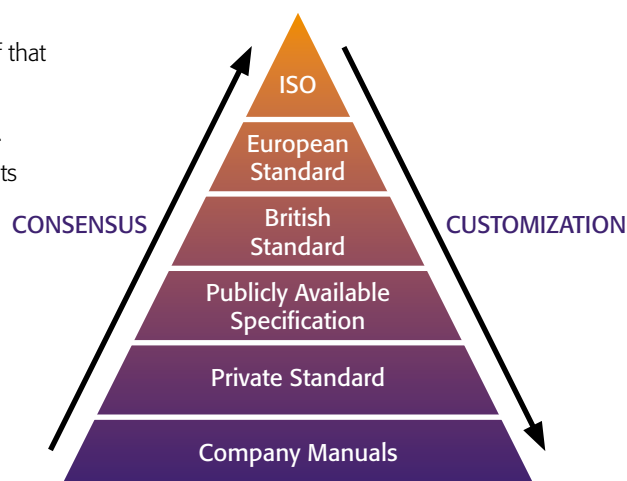
The Standards Pyramid: consensus vs customisation

But standards come in different flavours. Standardisation by definition is a consensus process. The formal route takes place at an international (ISO), European (CEN) and national level (BSI) through negotiation between delegations, which individual firms can only influence through their trade bodies.

Once documents have been agreed by the committees tasked with producing them, they cannot be altered except by those committees. Therefore, even UK British Standards cannot be altered to reflect, eg the KPI approach without persuading those committees via their constituent trade and professional bodies that the changes are worthwhile.

The situation is different with private, voluntary standards, where the parties can decide their own remit. The downside is that they cannot call the resulting document a British, European or International Standard, although the documents they create can become precursors to formal standards.

The diagram summarises the trade off that has to take place between consensus and customisation in standard making. Although this is a BSI diagram, it reflects the reality facing all organisations who would like to introduce and set standards.



Many users of standards show a ready appreciation of the value that standards could contribute to business processes:

- engineering consultants Ove Arup say: "Standards provide the platform...that then allows time for innovation and creativity..."
- retailer Tesco has seen the benefits of standards in its store development programmes: "Central to our strategy is the standardization and simplification of our stores."
- Celtic Technologies, a land remediation contractor, has found that standards improve quality and reduce uncertainty: "Standards have allowed us to work with greater consistency...."
- and the MOD considers standardization to be critical to success: "...the standardization process is essential to achieving the benefits of smart acquisition."

Other users interviewed specifically for the 16th May workshop comment:

"Appropriate standardisation can actually add value because it cuts out waste"

"Standards ensure that the bar is equal for everyone and provide a benchmark to compete against"

"Standards are essential because they are about good management practice. However, wrongly applied, they can be very administrative and bureaucratic"

"It is important to work to standards that everyone recognises are the best available"

"Standards should be used as a baseline from which you can build something that meets customers' needs"

"Standards are necessary, they establish benchmarks and provide measurements and definable positions, so they're essential"

"Standards should be continually reviewed, raising the bar so that everybody has to concentrate more on adding value rather than meeting the standard"

"Standards can help professionals and contractors be more competitive in their bids, because they're all bidding against the same information.. Standards help contractors focus on what delivers real value for money!"



Courtesy of Wates

"For every pound that we spend in construction we waste a pound and probably a lot of that is due to a lack of standards and standardisation"

A potential solution: linking standards to construction KPIs

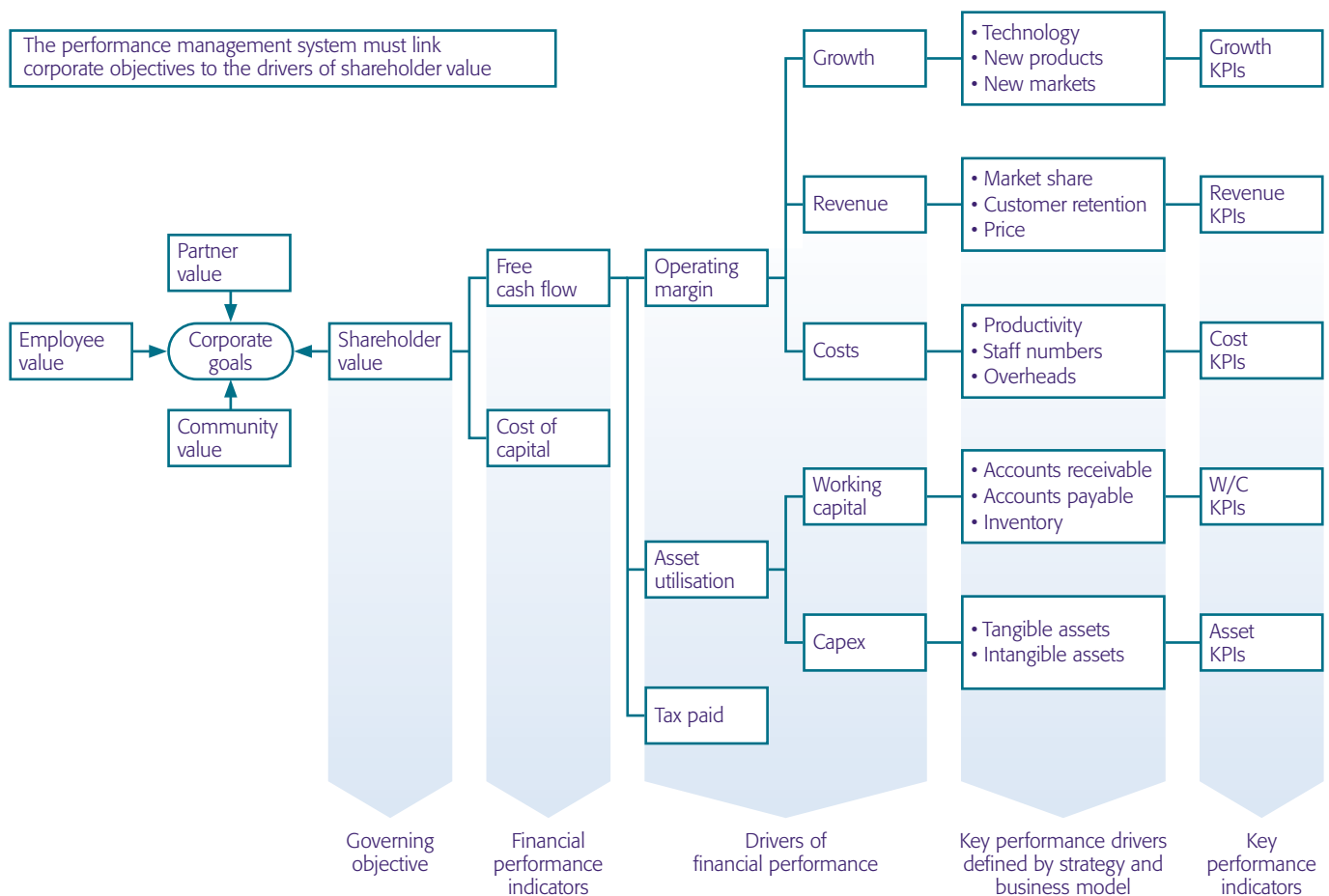
- The construction industry has completed a significant amount of work identifying drivers of performance and embodied them in the KPI approach
- It would be possible to allocate most existing standards to different KPIs – though there would be many gaps where standards do not yet exist
- Standards should reflect agreed good practice in any given area: they could set the benchmarks for performance in each case
- By mapping where standards linked to agreed KPIs, it would be possible to track the value that standards added to any given process, and aggregate the results across the industry.
- If it were not possible to determine the value from any given standard, it would provide a strong argument for discarding the standard.



Courtesy of Midas Group

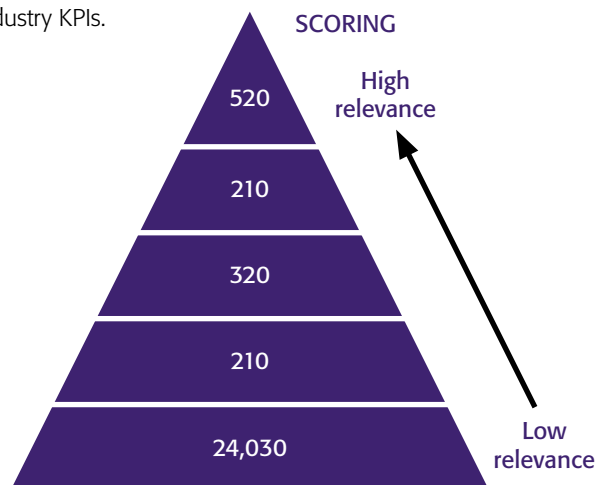
To ensure value creation is maximised KPIs must be aligned with the governing objectives of the organisation. These goals may be hard financial ones or more intangible goals such as reputation. The challenge for standards is to show clear linkage with value creation. The best way to do this is by linking them with KPIs.

The figure below illustrates the links between financial goals and possible KPIs.



Linking Standards With Sector KPIs

The figure shows the resultant ranking of all 25,000 BSI standards in order of relevance to the construction industry KPIs.



Industry Engagement Is Needed

This initial screen has shown there are currently a large number of links between standards and KPIs but also considerable gaps. There is clearly a good platform from which to increase standardisation in the construction sector; however to ensure success the involvement of industry and users is critical.

Specifically industry engagement is needed to:

- Define and agree issues and priorities
- Set clear expectations and objectives
- Ensure the development of standards is user driven and maximises value added
- Provide industry champions to promote the development and adoption of greater standardisation

Group Discussion

Following the keynote presentation in the afternoon, the attendees were split into two groups and asked to discuss and present their thoughts on the following questions.

- Can/should standards be linked to KPIs ?
- What are the potential problems to be overcome?
- What are the potential benefits from a new approach?

Can/should standards be linked to KPIs ?

- Why would it be worth doing? Standards reduce subjectivity and KPIs need to be simple and objective – a natural fit.
- KPIs should drive process improvement; standards could help to do this whilst maintaining eg safety
- There is a continuous, positive feedback loop.
KPIs → drive improvements → which suggest better standards → on which new KPIs can be based.
- There is much evidence from other industries to show this works: measure → improve → benchmark → measure.
- 'Critical Success Factors' would be a better approach than KPIs. CSFs should be the standards by which industry can measure success
- Standards will enable evidence-based decisions – does something do what it says on the tin?
- There are a number of different types of KPIs:
 - Client-driven, such as the KPIs run by Constructing Excellence
 - Product-driven, of use to manufacturers
 - Process-driven, of use to contractors, designers

What are the potential problems to be overcome?

- Identifying key activities to track, choosing appropriate KPIs and setting up measurement processes which can be linked to standards.
- Deciding relative priorities; eg time vs quality vs cost.
- Getting KPIs and their related standards enforced through contracts and public procurement requirements.
- Deciding on gaps in the standards portfolio. For example, there are no standards for managing the building life cycle as yet, or agreement on what makes a good school or hospital.
- Making sure standards are customer focused.
- Managing trade-offs. Looser quality and durability measures might make specification simpler, leaving detailed choice to suppliers.
- Introducing timelines/cut off dates in standards important in supporting innovation.
- Introducing standards for built environment or community issues. Urban planning is going towards codes: does this constrain or open out innovation?

“Once you know what you want you just need to bottle it in a standard.”

What are the potential benefits from a new approach?

- Greater relevance and value for end users of standards.
- Clarifying the business case for sustainability.
- New insight into what delivers better buildings for stakeholders.
- Helping the industry adapt to new processes, new skills and new technologies.

How do we take issues forward?

- Decide UK construction priorities.
- Map the current UK construction portfolio to market requirements.
- Where gaps exist, search the world for best practice.

Next Steps

During a final open, group discussion the delegates raised the following issues for discussion at future workshops:

Need for definitions

In order to define what drives value in 'construction', it is important to first define what is meant by 'construction'. Ideally, the term should be used in the broadest possible sense, to refer to stakeholders throughout the industry and at all stages in the life-cycle of buildings and civil engineering structures.

Need for market map

- A market map of the entire construction industry, showing its key players and their relationship with each other is required to identify key customer groups and their standards requirements.
- An agreed approach to market segmentation: it is important to decide on categories which are valid for each market sector. For example, client stakeholders could arguably be split into two groups – 'intelligent' clients vs small, single-purpose clients. Intelligent clients are likely to require standards which allow them to innovate. Small, single-purpose clients are likely to be more interested in compliance information.
- Stakeholder needs need to be mapped to building life cycles as requirements change over time.
- A sector focus will be critical, as needs within eg the residential market are quite different to the commercial or industrial sector.

Top priority themes for new standards

- New standards should focus on critical success factors (CSFs) rather than KPIs. 'CSFs should be the standards by which industry can measure success.'
- Sustainability needs to inform standards at every level
- Processes are as important as products

Industry engagement strategy

- Select one or two key new standards to initiate the new approach, for example ISO 15686 on Service Life Planning, and develop them with the support of key industry influence groups
- Launch the new standards with significant industry support from heavy-weight committees, professional institutions, and appropriate messaging and support from influential trade journals.
- Radically alter the presentation style of standards, and consider, integration with software, accreditation, training and continuing professional development (CPD)



Action Plan

As an outcome of this analysis, the following grid was drawn up, mapping the main vertical sectors of the construction market against horizontal process activities which take place within those sectors.

The grid assesses to what extent standards requirements differ across the horizontal and vertical axes. It is proposed to test these assumptions at six industry workshops during autumn 2006, and use the outcomes of those discussions to determine the need for new standards, and to re-appraise the value of the existing standards in each area.



Courtesy of NHBC

	Residential (houses, flats)	Commercial (shops, offices etc)	Infrastructure (roads, rail, utilities, telecoms)	Educational & health (schools, hospitals)	Industrial (factories, refineries, power plants)
Procurement & performance management	New headline series of specialised KPI/CSF standards required				
Structures & design	Some specialisation required for each market				
Construction products	Relatively little specialisation but bundling of standards required				
Building processes	Relatively little specialisation but lots of new standards needed				
Water	Relatively little specialisation but issues of scale				
Facilities management	Quite a lot of specialisation required				

Contacts



Carolyn White

Head of Construction Market Development

BSI

BSI Group Headquarters

389 Chiswick High Road

London

W4 4AL

T +44 (0)20 8996 7556

F +44 (0)20 8996 7187

E carolyn.white@bsi-global.com

www.bsi-global.com



Peter Cunningham

Director

Constructing Excellence in the Built Environment

Warwick House

25 Buckingham Palace Road

London

SW1W 0PP

T +44 (0)20 7592 1100

F +44 (0)20 7592 1101

E cunninghamp@constructingexcellence.org.uk

www.constructingexcellence.org.uk

For further information visit

www.constructingexcellence.org.uk/BSI



Constructing Excellence in the Built Environment

Warwick House
25 Buckingham Palace Road
London
SW1W 0PP

T 0845 605 5556
E helpdesk@constructingexcellence.org.uk
www.constructingexcellence.org.uk

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