

# **Rethinking Project Management; The Business Case for Sustainable Construction**

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## **Abstract**

By adopting key sustainability principles, construction can be transformed from problem to solution from each of an economic, social and environmental perspective. The contribution that construction can make to the delivery of a sustainable development agenda is now clearly understood. The argument that sustainable practices can make a major contribution to the long-term viability of the construction industry is compelling, but much less widely appreciated. This paper, based on work being carried out by Eid in support of a doctoral thesis, sets out to make the business case for sustainable construction and argues that barriers to realising the business case can be overcome by changing the business models employed by construction clients and construction companies. Specific focus is placed on new approaches to the integration of *project management processes, sustainability and competitiveness*.

## **Introduction**

There is now overwhelming evidence that human development is depleting natural capital at a faster rate than it can be replenished and is producing waste products at rates greater than global eco-systems can absorb (UNEP GEO, 2000). The consequence of operating economic systems beyond ecological limits is the destruction of the resource base and the whole-scale pollution of the life support systems upon which continued human development depends (RCEP, 2000).

The Intergovernmental Panel on Climate Change (IPCC, 2001) is calling for urgent measures to prepare for sea level rises, serious drought, floods and storms which threaten disaster for large areas of world.

Construction stands identified as a major part of the problem, as a primary contributor to climate change, resource depletion and pollution (DETR, 2000). Buildings consume energy in their operation and in the extraction and preparation of materials. The consequence is that the construction industry is directly and indirectly responsible for 50% of the total UK energy consumption and, given the present fuel mix, half of the resultant CO<sub>2</sub> emissions as a result of the construction and use of buildings and from the extraction and processing of materials. In the past one hundred years the level of CO<sub>2</sub> in the atmosphere has risen 27%, one quarter of which has come from burning fossil fuels just to provide energy for buildings. Carbon dioxide emissions from housing account for over a quarter of UK emissions.

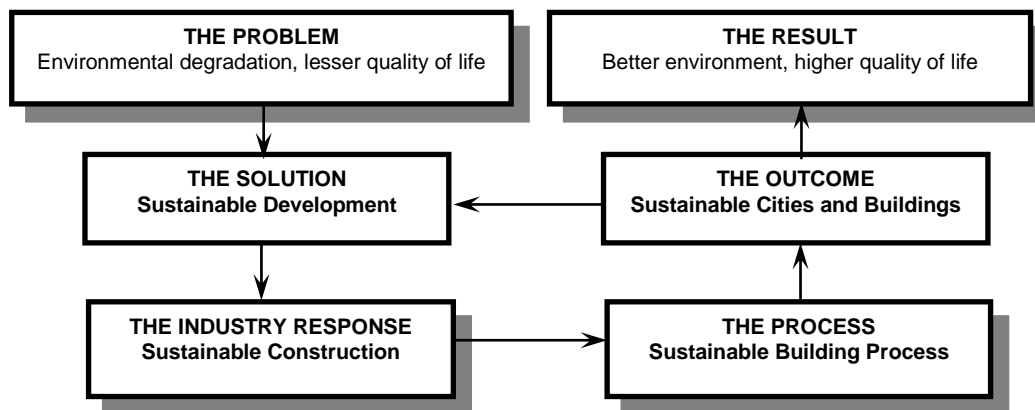
By any standards, the construction process as presently managed in the UK is highly inefficient, as confirmed by the recently published report of the Construction Task

Force “*Rethinking Construction*” (DETR, 1998). It also places emphasis on the need for a radical change of culture within the industry.

Construction is therefore clearly identified as part of the problem. It needs to be made part of the solution.

The construction industry has a major contribution to make to quality of life and to national economies. At a European level, the industry has achieved a level of competitiveness on a par with that of its main competitors (EU Commission, undated). Construction, building materials, and associated professional activities - including Project Management - account for a significant percentage of the Gross Domestic Product. Such success as has been achieved however at the expense of creating major environmental and social problems. The challenge is to make construction environmentally and socially sustainable without compromising its economic viability.

New policy initiatives and legislation can play a vital part in bringing about necessary transformations but change is unlikely to happen unless the industry as a whole is convinced that there is a business case for more sustainable construction.



**Figure 1: A Sustainable Construction Road Map (CIB, 1998)**

**Sustainable Construction**

Under the generic title of sustainable development three key policy agendas – climate change, social inclusion and competitiveness – are currently converging to present a radical challenge to the construction industry. That challenge is for construction companies to work collectively to integrate vital environmental and social considerations into their financial planning and business management. Greater resource efficiency lies at the heart of the sustainable development challenge for the construction industry (CIB,1999). Delivering social progress, protection of the environment, better resource use, economic growth and employment require a stable and competitive economy.

The key message is that sustainable development is not incompatible with competitiveness. Business cases have many opportunities to create environmental and/or social improvements whilst increasing profits and market shares which can create new sources of employment.

Sustainable development embraces the three broad themes of environmental, social and economic accountability, often known as the “Triple Bottom Line” (Elkington,

1999). It is about ensuring a better quality of life for everyone, now and for generations to follow.

*“Sustainable development isn’t outstanding environmental performance at the cost of a company, which goes out of business, nor is it outstanding financial performance at the cost of adverse effects on the local environment and communities. It does not demand the perfect solution. Sustainable development is essentially a goal or vision that forward looking organisations are working towards.”* (CBPP, 2001).

This goal of sustainability is the process of systematically and effectively integrating vital environmental and social concerns into economic development, financial planning and project management.

Business has reconciled the need for sustainable development with the demands of competitiveness through the concept of eco-efficiency.

*“It is clear that the various activities of the construction sector have to be regarded and analysed when considering sustainable development. As a matter of fact, on one side, the built environment constitutes one of the main supports (infrastructures, buildings) of economic development, and, on the other side, its construction has significant impacts on resources (land, materials, energy, water, human/social capital) and on the living and working environment. Hence the construction industry has a lot of direct and indirect links with the various aspects of sustainable development.”* (CIB, 1998).

Sustainable construction as a process promotes affordable solutions to the problems of the build environment that are ecologically intelligent, use benign energy, respond to local conditions and eliminate the concept of waste. So much is clear. The critical question is, can the business case be made equally compelling?

### **The Business Case for Sustainable Construction**

The authors believe that following sustainability principles (CIRIA, 2001 Pending Publication) can produce demonstrable business benefits by reducing costs, improving quality and increasing marketability. This aligns the policy objectives of sustainable construction with those of the Egan agenda and the UK's Strategy for Sustainable Construction published by the DETR (DETR, 2000).

What is implied here is not a trade-off but an approach to construction that sets out to satisfy the business case for sustainability by meeting essential economic, social and environmental objectives (WBCSD, 1997).

Contemporary studies (CIRIA, 2001 pending publication) suggest that a strong business case can exist for clients to adopt sustainable construction. These can be summarized as:

- An increase in building performance and customer satisfaction
- Increased shareholder value - as perceived risks of stock ownership are reduced
- Reduced costs
- Reduced risk
- Enhanced public relations and community liaison
- Increased employee motivation and enhanced productivity

- A better product through design teams being able to explore a wider range of solutions
- More efficient design and construction
- Reduced costs through new forms of accounting involving whole life costing
- Holistic, sustainable and appropriate environmental solutions
- Better decision-making through an informed balance of quality and cost
- Reduced liability through better risk management
- Minimisation of the financial penalties and negative publicity associated with non-compliance with environmental regulation
- Improvements in business efficiency through active management of sustainability performance
- Increased capacity to innovate and improve efficiency and reduce waste
- Ability to recruit most able staff
- Capacity to retain able staff, reducing recruitment, training costs and loss of institutional knowledge
- Stronger long term relationships and ways of working with business partners through greater use of partnering arrangements.
- High opportunity costs in terms of loss of customer confidence and competitiveness stemming from poor sustainability performance
- Other business benefits can arise from effective working with local communities (Thomson and Talbot, 1998)

However strong the case, it is not yet seen as compelling enough to provoke an industry wide take-up of sustainable practices needed to make construction part of the solution (CIRIA, 2001 pending publication).

### **Sustainability Vs PMBOK:**

The project management (PM) practices in the construction industry are fundamental to the successful completion of any construction project. The authors believe that sustainability has a significant contribution to the PM process and in order to lead the construction industry through a more sustainable path, the collaboration of all practices involved with the industry including PM is essential.

The progress of the construction industry mainly relies on the ongoing relationship between stakeholders, economic value and the built environment, and PM is no different:

*“Projects and project management operate in an environment broader than that of the project itself”* (PMBOK, 2000)

The Project Management Book of Knowledge (PMBOK) refers to sustainability briefly without making explicit the essential points of connection between sustainability and project management. Nevertheless, some key points have been mentioned: -

*“The project management team must understand this broader context-managing the day-to-day activities of the project is necessary for success but not sufficient.”* (PMBOK, 2000).

The key aspects of the project management context described in the PMBOK are:

1. Project phases and the project life cycle
2. Project stakeholders
3. Organizational Influences
4. Key general management skills
5. *Social-Economic-Environmental Influences*

Obviously the fifth key aspects is all about the triple bottom line. In the authors view, the barriers to be overcome would be more manageable by linking and integrating the three elements of this paper; PM, Sustainability and competitiveness. This integration would deliver a clearer business case for sustainable construction.

### **Competitiveness Vs Sustainability:**

Seeking a more profitable and competitive economy for the construction industry, the European Commission has identified some key elements to improve the industry's competitiveness to achieve four major objectives. These objectives are improving the quality in construction, improving the regulatory environment, improving the education and training provision and finally re-orienting research and development.

A simple table can be used to emphasise the linkages between sustainability and the key interrelated elements of competitiveness.

<b>Key Interrelated Elements of Competitiveness</b>	<b>The Sustainability Linkage</b>
<b>Quality</b>	Clients now expect companies to compete on quality as well as price. Sustainability is clearly established as a key component of quality.
<b>Markets</b>	Leading sustainable companies will be in a strong position not simply to meet the needs of markets but to transform them (Elkington, 1999)
<b>Equitable market conditions</b>	Companies not promoting sustainable practices will be exposed. Those investing in best sustainability practice and able to add real value to contracts will be rewarded
<b>Construction process</b>	The future for the construction industry will be a future of change, and will be knowledge-driven. Only companies willing and able to work through new forms of procurement and collaborative working will prosper. Collaboration and integrated working is of the essence in sustainability.
<b>Environment</b>	Customers are growing wise and discriminating in demanding environmentally sound products and services. Such outcomes are fundamental to sustainable construction
<b>Regulatory framework</b>	The regulatory environment is responding to the growing threats of climate change and resource depletion and will eventually regulate non sustainable companies out of existence
<b>Human resources</b>	Respect for customers and for employees is of the essence in sustainable enterprise. Willingness to invest in training and job satisfaction will be key indicators of the competitive company of the future
<b>Technology</b>	Forward planning, future proofing and investment in innovative technologies and systems of management are key aspects of sustainability - and competitiveness
<b>Structure of the sector</b>	Sustainable economic systems will be diverse systems held together by effective networks. Fragmentation and disconnection are characteristics of un-competitive structures
<b>Illegal practices</b>	Regard for sustainability best practice will drive out the shoddy and the corrupt

**Table 1: Linking Sustainability to the Key elements of competitiveness.**

## PM Vs Competitiveness

Having discussed the contribution of sustainability to competitiveness as a major contributor to the business case; we seek to demonstrate the contribution of sustainability to project management processes and areas of knowledge (as identified by PMBOK). The linkage of sustainability to project management is described in the following elements:

1. Standards and Regulations
2. Internationalization
3. Cultural Influences
4. Social-Economic-Environmental Sustainability

These four elements are also used by the European Commission in defining some of the key interrelated elements of competitiveness as follows:

- *Markets*: Where the Commission argues the competitiveness level on different levels of Markets mainly on the International level where circumstances that might affect the project are different than what the EU organisations might be used to due to the vast contribution of the European construction industry to the international market.
- *Equitable Markets*: “*Internationally, given the strong position of the EU companies in the global market and the size of the contracts at stake, the EU has a proactive interest in ensuring that markets are open on equal terms.*” (EU Commission, undated)
- *Construction Process*: The need to adapt to developments in technology and practice is driving the change in the construction process. “*Key aspects in improving the overall efficiency and competitiveness of the sector are the development and new relationships between actors, enhancements in communication and decision making, and the improved organisation and management of the whole process, particularly on site.*” (EU Commission, undated)
- *Environment*: The European Commission describes the achievement of environmental objectives and the early integration of environmental concerns in the construction life cycle are drivers for improving the industry’s environmental record as advised in the PMBOK. Both refer to such concerns as tools for improving social aspects of the process as well as environmental.
- *Human Resources*: as a key element of competitiveness, it has a major impact on the social side of any project. Both project management context as well as the theory of competitiveness call for better human resources awareness and training as a tool for delivering a better social as well as economic aspect for the business case.
- *Technology*: Innovation and technology combine to deliver a better competitive industry. Regulations and Standards described by the PMBOK as an element of the PM context have their own fundamental input on the technology used for the project. The difference between regulations and standards has to be clear to avoid the influence of this confusion on the technology used to minimise the project risk of technology misuse.

## PM Vs Sustainability

The authors perceive the PM process as a fertile environment for developing a more sustainable process. We believe the key lies with the points of contact between the

project management processes and the triple bottom line (Elkington, 1999) of sustainability through the Areas of Knowledge identified by the PMBOK.

Triple Bottom Line PM Processes	SOCIAL		ECONOMIC		ENVIRONMENTAL	
	PM Area of Knowledge	Relevance	PM Area of Knowledge	Relevance	PM Area of Knowledge	Relevance
1- INITIATING	5.1 Initiation	***	5.1 Initiation	***		
2- PLANNING	4.1 Project Plan Development	***	4.1 Project Plan Development	***	4.1 Project Plan Development	***
	5.2 Scope Planning	***	5.2 Scope Planning	***	5.2 Scope Planning	***
	5.3 Scope Definition	***	5.3 Scope Definition	***	5.3 Scope Definition	***
	6.1 Activity Definition	***	6.1 Activity Definition	***	6.1 Activity Definition	***
	6.2 Activity Sequencing	**	6.2 Activity Sequencing	***	6.2 Activity Sequencing	**
	6.3 Activity Duration Estimating	*	6.3 Activity Duration Estimating	**	6.3 Activity Duration Estimating	*
	6.4 Schedule Development	*	6.4 Schedule Development	**	6.4 Schedule Development	*
	7.1 Resource Planning	**	7.1 Resource Planning	***		
			7.2 Cost Estimating	***		
			7.3 Cost Budgeting	***		
	8.1 Quality Planning	**	8.1 Quality Planning	**	8.1 Quality Planning	**
	9.1 Organisational Planning	***	9.1 Organisational Planning	*		
	9.2 Staff Acquisition	***				
	10.1 Communication Planning	**	10.1 Communication Planning	*		
	11.1 Risk Management Planning	**	11.1 Risk Management Planning	***		
11.2 Risk Identification	***	11.2 Risk Identification	***	11.2 Risk Identification	***	
11.3 Qualitative Risk Analysis	**	11.3 Qualitative Risk Analysis	***	11.3 Qualitative Risk Analysis	**	
11.4 Quantitative Risk Analysis	**	11.4 Quantitative Risk Analysis	***	11.4 Quantitative Risk Analysis	**	
11.5 Risk Response Planning	**	11.5 Risk Response Planning	***	11.5 Risk Response Planning	**	
		12.1 Procurement Planning	***	12.1 Procurement Planning	**	
3- EXECUTING	4.2 Project Plan Execution	*	4.2 Project Plan Execution	***	4.2 Project Plan Execution	*
	8.2 Quality Assurance	*	8.2 Quality Assurance	**	8.2 Quality Assurance	*
	9.3 Team Development	***				
			10.2 Information Distribution	**		
		12.4 Source Selection	***	12.4 Source Selection	**	
4- CONTROLLING	4.3 Integrated Change Control	*	4.3 Integrated Change Control	*	4.3 Integrated Change Control	*
	5.4 Scope Verification	***	5.4 Scope Verification	***	5.4 Scope Verification	***
	5.5 Scope Change Control	***	5.5 Scope Change Control	***	5.5 Scope Change Control	***
	6.5 Schedule Control	**	6.5 Schedule Control	**	6.5 Schedule Control	**
			7.4 Cost Control	***		
			8.3 Quality Control	**		
		10.3 Performance Reporting	**	10.3 Performance Reporting	*	
		11.6 Risk Monitoring & Control	**	11.6 Risk Monitoring & Control	**	
5- CLOSING	The Closing Prozesse is not directly related to the Sustainability approach because it mainly consists of paper work and documentations of the legal aspects as well as the analysis of the targets achievement and the lessons learned.					

**Table 2: Mapping of Project Management Processes to Sustainability through Knowledge Areas.**

The PM Area of Knowledge Key:

4- Project Integration Management

5- Project Scope Management

6- Project Time Management

7- Project Cost Management

8- Project Quality Management

9- Project Human Resource Management

10- Project Communications Management

11- Project Risk Management

12- Project Procurement Management

This Table is not meant to be exclusive, but to demonstrate how the PM Processes can be integrated with Sustainability and to identify the potential areas of knowledge, which could lead to a more sustainable approach.

## Conclusion

There are major inefficiencies in the construction process and there is a potential for a much more systemised and integrated project process based on good science and assessment of risk, balancing ecological, economic and social objectives. The construction industry is currently underperforming in these objectives, which means a significant opportunity cost associated with unsustainable construction exists.

The adaptation of sustainable construction has been facing a principal barrier that lies with the prevailing business models and project management techniques employed by construction companies. Such models and methods are frequently unresponsive to sustainability drivers and therefore fail to deliver the appropriate business signals to financial planners and other key decision makers which would otherwise encourage and support investment in more sustainable practises whilst leading to greater market differentiation on quality as well as price.

The business case for sustainable construction has to be identified by all stakeholders and perceived as a better chance for performance. The European Commission has promoted competitiveness as integral to the business case.

The authors have sought to demonstrate that it is not competitiveness by itself that is key but the establishment of a vital connection between *sustainability*, *competitiveness* and *Project management* provides the essential link.

A new generation of project management techniques and tools is needed to reflect this revolution in approach by thinking and acting sustainably. The specification of such tools is a key objective of the research project currently being undertaken by Eid at the University of Edinburgh.

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**Figure 1:** CIB report Workgroup 82 Publication 225, *Sustainable Development and the Future of Construction*. 1998, (p.14)