Corporate Responsibility Application–UK Construction SME

Eric C.W. Lou, Angela Lee, and Gill Mathison

***Abstract*—Construction organisations (SMEs in particular) are now taking a responsible attitude, going beyond the minimum legal requirements. In line with the UK Government's innovation objectives under The Strategy for Sustainable Construction, organisations are looking to develop and implement management systems to address the corporate responsibility (CR) aspects of the business. This paper investigates the initiation, development and practice of CR in construction organisations, and presents a case for possible adoption for construction SMEs. By combining key indicators of CR and achieving business success and competitive advantage, the pervasiveness of CR for construction SMEs is determined.**

***Index Terms*—Corporate responsibility, construction, small and medium enterprise, SME, UK.**

I. The UK Construction Industry

The UK construction industry (CI) generates an estimated output worth over £100bn a year, accounts for 8% of national gross domestic product (GDP) and employs around 3 million workers. Construction expenditure in the private sector amounts to two-thirds of all procured contracts and small and medium enterprises (SMEs) represent of 80% of the UK CI [1]. The SMEs in the UK CI accounts for approximately 40% of GDP and is a major contributor to local economies [2]. This reflects the significant impact of SMEs within the sector, and also reflects the competition among the organisations to win more work. In the present economic slowdown and recession, the race is now to gain competitive advantage over their competitors. According to Robbins *et al.* [3] SMEs are important to the economic vitality of cities, states and the countries due to their significant number and employees. However, they tend to display vulnerability in facing up to various conditions prevailing in a country's economy resulting in business failure. The ability of SMEs to turnaround their companies are constrained due to the limited access to financial resources and capital [4]. The sluggish grown and the lack of liquidity in the industry is forcing organisation to be different, or be in the danger of going out of business. With its weight on its shoulders, the SMEs carry the burden of leadership and change – and to have a positive impact on development, business and society – construction sustainability is high in the agenda.

Led by the Department for Business Innovation and Skills (BIS), the UK Government has taken the first step in spearheading sustainability in construction. The Strategy for Sustainable Construction [5] is a joint industry and Government initiative intended to promote leadership and behavioural change, as well as delivering benefits to both the CI and the wider economy. It aims to realise the shared vision of sustainable construction by providing clarity to business on the Government's position by bringing together diverse regulations and initiatives relating to sustainability; setting and committing to higher standards to help achieve sustainability in specific areas; and making specific commitments by industry and Government to take the sustainable construction agenda forward [1]. The strategy acknowledges the need for changes to achieve sustainability for the industry. The business case for the sustainable construction agenda encapsulates construction organisations and their wider supply chain by increasing profitability through a more efficient use of resources, procuring sustainable products or ways of working and the opportunity to improve organisational image and profile in the industry by addressing issues relating to Corporate Responsibility (CR) or Corporate Social Responsibility (CSR).

II. CE/CSR Standards

In driving CR/CSR forward, it is critical for organisations to be able to evaluate where they were yesterday, their position today, and what they want to achieve in the future – something to be measured for and against. A common standard of CSR is essential to ensure collective agreement in terms of quality, safety, costs, reliability, efficiency and inter-changeability. As mention above, the segregation and disjunction on the concepts of CSR produced a myriad of reporting guidelines or standards available to organisations to follow. The ISO 26000 provides a globally relevant guidance for private and public sector organisations of all types based on international consensus among expert representatives of the main stakeholder groups, and so encourages the implementation of best practice in social responsibility worldwide [6]. The ISO 26000 looks into organisational governance, human rights, labour practice, the environment, fair operating practice, consumer issues and community involvement and development. AccountAbility AA1000 is an accountability standard focused on securing the quality of social and ethical accounting, auditing and reporting. It is a foundation standard, and as such can be used as a common

Manuscript received March 31, 2012; revised in July 27, 2012.

Eric C.W. Lou is with Create Construction Ltd, 1 Neptune Court, Hallam Way, Blackpool FY4 5LZ, UK and the School of Built Environment, University of Salford, Greater Manchester M5 4WT, UK (e-mail: eric.lou@createconstriction.co.uk, e.c.w.lou@salford.ac.uk).

Angela Lee is with the School of Built Environment, University of Salford, Greater Manchester M5 4WT, UK (e-mail: a.lee@salford.ac.uk).

Gill Mathison is with Create Construction Ltd, 1 Neptune Court, Hallam Way, Blackpool FY4 5LZ, UK (e-mail: gill.mathison@createconstriction.co.uk).

DOI: 10.7763/IJEEEE.2012.V2.160

currency to underpin the quality of specialised accountability standards, existing and emergent, and as a stand- alone system and process for managing and communicating social and ethical accountability and performance [7]. Another well recognised standard is the Social Accountability (SA8000) by Social Accountability International (SAI). The aim of SA8000 is to provide a standard based on international human rights norms and national labour laws that will protect and empower all personnel within a company's scope of control and influence, who produce products or provide services for that company, including personnel employed by the company itself, as well as by its suppliers/ subcontractors, sub-suppliers, and home workers. More standards and their purpose are as listed in Table I.

TABLE I: VARIOUS CR/CSR STANDARDS.

Report	CR/CSR Definition
ISO [6]	This standard is intended for use by organisations of all types, in both public and private sectors, in developed and developing countries, as well as in economies in transition. It will assist them in their efforts to operate in the socially responsible manner that society increasingly demands. This is a voluntary guidance, not requirements, and therefore is not for use as a certification standard.
AccountAbility [7]	The purpose of the AA1000 is to provide organisations with an internationally accepted, freely available set of principles to frame and structure the way in which they understand, govern, administer, implement, evaluate and communicate their accountability – based on 3 principles – The Foundation Principle of Inclusivity; The Principle of Materiality; and The Principle of Responsiveness.
IISD [8]	Key areas of concern are environmental protection and the wellbeing of employees, the community and civil society in general, both now and in the future.
GRI [9]	The GRI is a network based non-governmental organization that aims to drive sustainability and Environmental, Social and Governance (ESG) reporting. The framework sets out the principles and indicators that organisations can use to measure and report their economic, environmental, and social performance.
Good Corporation [10]	The GoodCorporation Standard is based on a core set of principles that define a framework for responsible management in any type of organisation. Under each principle, the Standard sets out management practices that can be assessed to determine how well the organisation works in reality. GoodCorporation uses an independent assessment process that looks at four levels of evidence for each individual practice and assesses them against a five-point scale.
Accounting for Sustainability [11]	The CRF is a reporting model that presents key sustainability information alongside more conventional financial information to give a more rounded and balanced picture of the organisation's overall performance. It explains how all areas of organisational performance can be presented in a connected way, reflecting the organisation's strategy and the way it is managed.
SAI [12]	An auditable standard for a third-party verification system, setting out the voluntary requirements to be met by employers in the workplace, including workers' rights, workplace conditions, and management systems. The normative elements of this standard are based on national law, international human rights norms and the conventions of the ILO.

III. CORPORATE RESPONSIBILITY IN CONSTRUCTION

TABLE II: VARIOUS DEFINITIONS OF CR/CSR [11].

Report	CR/CSR Definition
ISO [6]	The essential characteristic of social responsibility is the willingness of an organisation to incorporate social and environmental considerations in its decision making and to be accountable for the impacts of its decisions and activities on society and the environment. This implies both transparent and ethical behaviour that contributes to sustainable development, is in compliance with applicable law and is consistent with international norms of behaviour.
AccountAbility [7]	It combines the terms social and ethical to refer to the systems and individual behaviour within an organisation and to the direct and indirect impact of an organisation's activities on stakeholders. Social and ethical issues (relating to systems, behaviour and impacts) are defined by an organisation's values and aims, through the influence of the interests and expectations of its stakeholders, and by societal norms and expectations.
Business Link UK [18]	CR/CSR is about understanding your business' impact on the wider world and considering how you can use this impact in a positive way. It means taking a responsible attitude, going beyond the minimum legal requirements and following straightforward principles that apply whatever the size of your business.
European Commission [19]	CR/CSR is a concept whereby companies integrate social and environmental concerns in their business operations and in their interaction with their stakeholders on a voluntary basis. It is about enterprises deciding to go beyond minimum legal requirements and obligations stemming from collective agreements in order to address societal needs.
WBCSD [20]	The integration of social and environmental values within a company's core business operations and to the engagement with stakeholders to improve the well-being of society.
IISD [8]	CR/CSR promotes a vision of business accountability to a wide range of stakeholders, besides shareholders and investors. The concept is underpinned by the idea that corporations can no longer act as isolated economic entities operating in detachment from broader society.
BSR [21]	Business decision making linked to ethical values, compliance with legal requirements, and respect for people, communities, and the environment around the world.
CIRIA [22]	A commitment by organisations to integrate socially responsible principles and concerns of stakeholders in their operations, in a manner that fulfils and exceeds current legal and commercial expectations.

The CR/CSR acronym is being described as the 'the hot business issue of the noughties' [13] and 'the talk of the town in corporate circles these days' [14]. However, the notion of CR/CSR means different things to different people, in different contexts, and for different purposes. As a result, a large gap exists between ideas and concepts, on the one hand, and practical applications and implications, on the other [15]. Gaps also exist between new expectations and capabilities in place. Investors, as well as policy makers, would be well served by the availability of tools to reduce ambiguity about decision and choices in this general domain. Much of what we know about CR/CSR – in theory and in practice – comes from a range of studies that provide a view of past performance, current assessment, and future expectations [16]. The view that social responsibility is applicable to all organisations emerged as different types of organisations, not

just those in the business world, recognised that they too had responsibilities for contributing to sustainable development. The perception and reality of an organisation's performance on social responsibility can influence its competitive advantage; its reputation; its ability to attract and retain workers or members, customers, clients or users; the maintenance of employees' morale, commitment and productivity; the view of investors, owners, donors, sponsors and the financial community; the relationship with companies, governments, the media, suppliers, peers, customers and the community in which it operates, among other things [17]. Table II presents a detailed literature review of the worldwide standards and purpose of CR/CSR. From the incongruent definitions and scope between corporate responsibility and corporate social responsibility, this paper defines CR as the overall umbrella term for social, economy and the community.

IV. Case Study

A single case study is established to understand, immerse and learn the perspective of UK CI SMEs on the uptake of CR in their business. The selected organisation is a Knowledge Transfer Partnership [23] partner, whom has declared an interest in developing a CR strategy for the organisation. CC was established in 2006, providing specialist construction service to a UK wide client base; and taking great pride in the flexibility of its service options covering design and build, construction and interiors; primarily in the education, leisure and retail sectors, with a typical contract of up to £6 million and a yearly turnover of £20 million. Through desk research – global, EU and UK regulatory framework directives, best practice guidance and success stories are collated, articulated and synergised. Potential CR key indicators, regulatory policies (current and future) and implementation frameworks are considered. The strategy could only be realised when all three elements (culture, support and strategy), and accelerated by external best practice and internal policies; and all operationalised through IT, as illustrated in Fig. 1.

The organisation's CR strategy was developed in consultation internal and external stakeholders and is aligned to the ISO 26000 [6], AA1000 policies [7] and GRI reporting standards [9]; encapsulates five major factors - Corporate Governance, Community, Employee, Business-to-Business and the Environment - and empowered using IT, as shown in Fig. 2. As a construction organisation, it is empirical that the emphasis is on the environmental responsibility. The CR strategy is mapped with its fundamental business process to establish core links between organisational strategy and CR strategy - both supporting and integrating each other. A gap analysis is also taken to identify any disparities between the two. As a result of incorporating the CR strategy into the business, various smaller initiatives began to emerge.

A. New Environmental Policies

Inline with CC responsibility to the environment, industry-wide best practice and CC standard operating procedures is merged. This is essential to ensure all Project Managers and Site Managers operate in a streamlined process. *Pollution Control Policy (Air/Dust)* – The organisation recognises that air pollution on sites can have a detrimental impact on the environment in which we live and work and on the health of local residents. CC is committed to take control measure to minimise the pollution our sites produce. This policy is aligned to National Air Quality Strategy, UK. [24] [25]. *Sustainable Procurement Policy* – The organisation is committed to the sustainable procurement of construction products. By definition, sustainable procurement is the process of purchasing goods and services that takes into account the social, economic and environmental impact that such purchasing has on people and communities. *Water Environment* Policy – The organisation recognises that precautions must be taken to ensure the complete protection of watercourses and ground water, against pollution. *Carbon Policy* – The organisation recognises the importance of reporting carbon emissions and is proactively working towards reducing the direct impact of its operations on the climate. Responsibility for the achievement of carbon goals and reduction target lies with all the staff and supply chain partners.

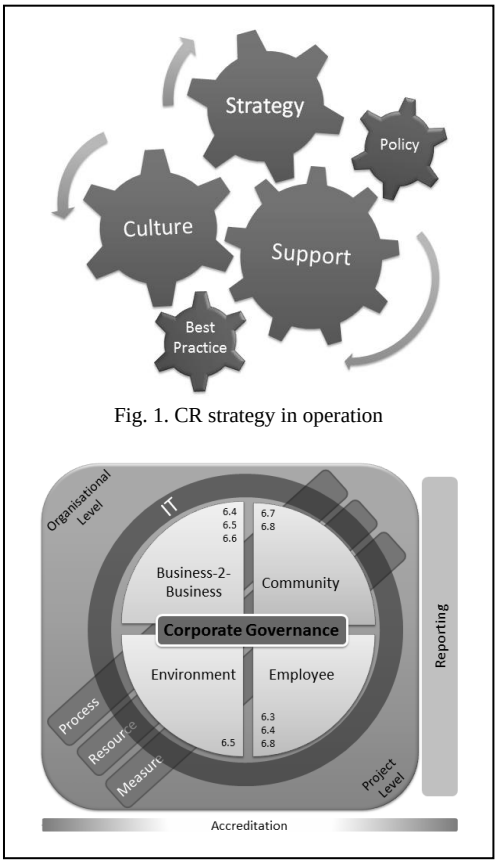


Fig. 1. CR strategy in operation

Fig. 2. CC CR strategy

B. Annual Corporate Responsibility Report

The organisation will now be reporting on its corporate responsibility policies, procedures and activities – this provides the framework for data, information and intelligence collection in the organisation. This will report on the organsiation's activities in accordance to their CR strategy (Figure 2), reflecting on the environment, business-2-business, community and employee. This report will also provide the platform for the organisation to report business activities, construction case studies, success stories,

future initiatives and foresighting of the business; and contents of this report will be the benchmark for future reports to come. Most importantly, this report will be compliant with the ISO26000 [6] and AccountAbility's AA1000 [7] standards and will conform to the Global Reporting Initiative version 3.1 (GRI 3.1) reporting framework [9], as discussed above. The organisation is performing above and beyond expectation by reporting their activities, although not required by law.

C. BREEAM

The BRE Environmental Assessment Method (BREEAM) sets the standard for best practice in sustainable building design, construction and operation and has become one of the most comprehensive and widely recognised measures of a building's environmental performance [26]. The organisation's involvement in BREEAM is in its infancy – summary reports, common targets and pre-requisites were prepared for the decision makers in the organisation to provide a holistic overview; detailed technical reports were prepared for submission to the BREEAM assessors/administrators. The organisation is taking major strides to be a leader in the field.

D. Considerate Constructors Scheme (CCS)

CCS is a voluntary initiative that operates on Site and Company Codes of Considerate Practice, with which participating construction companies and sites register. This scheme is a non-profit-making, independent organisation founded by the industry to improve its image [27]. CCS sits very highly in the organisation's agenda – this provides an external party to evaluate the organisation's corporate responsibility on their project sites, and playing their part in improving the image of the construction industry. A list of best practice, checklist and pre-requisites are prepared for the sit managers - to assist them to be more responsible for their action on site, and is designed to encourage performance beyond statutory requirements.

E. Carbon Emission Calculator, Help Guide, Site and Visitor Logs

The organisation commissioned a new carbon emission calculator customised to the internal and external processes of the organisation. This also forms part of organisational Carbon Policy, and to compliment the Considerate Constructors Scheme [27] and BREEAM Schemes [26]. The calculations are aligned to standards, protocols and statistics as provided by the GHG Initiative, [28] DECC [29], DEFRA [29] and The Carbon Trust [30]. The calculations encapsulate Scope 1, 2 and 3 (direct and indirect emissions) within the GHG framework [28].

F. New Pre-Qualification Questionnaire (PQQ)

PQQ are the first meeting point between the organisation and potential business partners – getting this perfect reflect the values, ethos and character of the organisation. The overhaul of the PQQ is an important milestone for the organisation as it grows larger (size and turnover) and be a more matured business. The new version includes corporate responsibility indicators (eg. community engagement, equality and diversity, etc.) and international standards requirements (eg. ISO9001, ISO14001, etc.) Business partners will also be graded into tiers of qualification and guides will be provided for businesses to improve their tiers. This process will be automated into an online system, where business partners will be able to update profiles to progress in their tiers.

This new PQQ will be an online system, where process and procedures are automated to reduce workload for staff. The most critical part of the online system is the process mapping for the organisation to ensure seamless integration with existing processes, and the requirements capture to ensure all relevant information is captured.

G. Waste Management

The organisation understands the importance of waste management and its effect on the environment. They are committed to minimising waste production by employing the waste hierarchy – waste prevention, minimisation, reuse, recycling, recovery and only then disposal at every stage of our operations. The organisation is further committed to ensuring that all operations and activities are fully compliant with all current national, European and international waste management legislation. The organisation also aims to minimise waste production throughout the organisation and to operate within full compliance of The Waste (England and Wales) Regulations 2011 [31] and the Duty of Care programme.

The organisation appreciates that the correct handling, storage and disposal of waste materials is vital to ensure compliance with environmental legislation and pollution prevention. They will be fully compliant with their Duty of Care responsibilities and ensure that waste does not escape from control and is passed only to an authorised person accompanied by a full written description in the form of Waste Transfer Notes.

The organisation is also committed to minimise the production of hazardous waste by purchasing low or non-hazardous materials; improving hazardous waste segregation and storage measures on construction sites; never mix hazardous and non-hazardous waste streams to reduce the amount of hazardous waste to be disposed of; always seal and contain processes to prevent the escape of fumes or leaks to the environment; and taking extra care when weighing and transferring chemicals to minimize spills.

A further action to prevent and minimize waste, a pre-demolition/pre-refurbishment audit of the existing building to determine if, in the case of demolition, refurbishment is feasible and, if not, to maximise the recovery of material from demolition or refurbishment.

H. Site Waste Management Plan (SWMP)

SWMP is a platform for the construction team to prepare, estimate, implement and review construction site waste. By legislation, any client who intends to carry out a project on any construction site with an estimated cost greater than £300,000 excluding VAT must prepare a SWMP conforming to Site Waste Management Plans Regulations 2008 [32], in accordance to the Clean Neighbourhoods and Environment Act 2005 [33]. The organisation's SWMP is aligned to BRE's SmartWaste online system [34].

I. Sustainable Procurement

Sustainable procurement is about minimising impacts of the supply chain through social and environmental considerations; minimising impacts of products and services by reducing waste and increasing renewable energy; and purchasing efficient products such as high recycled content products, energy-efficient appliances and fuel efficient vehicles [35]. The organisation is working with external consultants to create internal key performance indicators, new process and procedures to achieve this – inline with the BES6001 (Framework Standard for the Responsible Sourcing of Construction Products) standards [36].

The ensure environmental sustainability, the organisation is committed to consider and take into account the environmental performance and impact of materials when making purchasing decisions and will take into account the impact on natural resources when choosing goods and materials. The organisation will minimise the use of materials with a hazardous content whenever technically and commercially feasible. In addition, they will also consider specifications during the design and construction process to reduce waste. All timber and wood based products will only be purchase from a certified legal and sustainable chain of custody source; registration certificates and delivery tickets stating the certifier are required for all deliveries. The organisation's sub-contractors are required to have an Environmental Policy and comply with relevant environmental protection laws and regulations and they encourage their supply chain to implement or to be working towards a third-party certified Environmental Management System.

In the selection of materials, the organisation encourages the use of the following publications to inform material choices during the selection process: BRE - Green Guide [37], Green Book [38] and Red Book [39]; WRAP - Recycled Content Product Guide [40] and Reclaimed Building Products Guide [41]. The use of these tools allows the organisation to select particular materials on the basis of personal or organisational preferences or priorities, and to take these decisions based on the performance of a material against a particular environmental impact, project requirements in terms of use of materials incorporating recycled content and in terms of use of reclaimed materials.

The organisation support local economic regeneration through their local procurement activities. They encourage local procurement of materials where feasible, urge their supply chain to employ local labour and will collaborate with the supply chain partners and local agencies to find appropriate opportunities for skills, training, work experience and apprenticeships.

J. Giving back to the Community

The organisation has always has a strong connection with the community they are working with. The culture of 'giving back' to the local community is a way to demonstrate their commitment to make things better – by simply be more responsible in what they do. The organisation have teamed-up with local education collages to assist in training unemployed adults in construction and associated skills. This will open up more working opportunities within the organisation, suppliers or sub-contractors. The organisaiton is also working with higher learning institutions in offering site visits and the opportunity for prospective trade students to have a hands-on experience in the industry. Together with Universities, the organisation is now offering short-term project consultancy, research opportunities and industry experience for undergraduate and postgraduate students.

V. Conclusion

In this present gloomy economic climate, construction organisations are seeking for new competitive advantage to stay ahead of the game. Organisations are now taking a responsible attitude, going beyond the minimum legal requirements, following CR principles that apply whatever the size of the business. This paper reported on the growing adoption of CR as a core business strategy; it began by reviewing the various definitions of CR and differing standards, before describing as a case study the necessary steps of how a CI SME is trying to embed CR within their business. Definitions of CR vary considerably and encompass differing aspects, the majority of which cover social and environmental aspects. Further, there are a growing number of international regulatory bodies that have set up CR policies; however, all are voluntary unless imposed by specific governments. Thus, no clear guidance is explicated to help organisations implement CR, particularly for SMEs. A case study was presented in this paper to evidence how a CI SME embarked on incorporating CR principles. Firstly, a strategic CR policy was developed which complimented the existing business process. The policy then spore various initiatives in the organisation, such as new environmental policies, new pre-qualification questionnaire, environment assessment mechanisms (BREEAM), considerate constructors, carbon emission calculations, site waste management and sustainable procurement practices. The way forward sees the organisation incorporating international standards in quality management and environmental management systems. It is clear from the case study that for successful CR implementation in construction organisations, there must be a synergy between research and best practices, and practical applications of CR into the organisation. Research is still on-going to provide further evidence that CR within the organisation will generate further business and strengthen Client relationships and improve the ethos of the organisation.

References

[1] BIS SME's. (May 2011). *Constructionline*. Department for Business Innovation and Skills. [Online]. Available: http://www.constructionline.co.uk/static/suppliers/sme-faqs.html

[2] D. K. Robbins, L. J. Pantuosco, D. F. Parker, and B. K. Fuller, "An empirical assessment of the contribution of small business employment to US state economic performance," *Small Business Economics*, vol. 15, no. 4, pp. 293-302, 2000.

[3] B. A. Kirchhoff, *Entrepreneurship and Dynamic Capitalism: The Economics of Business Firm Formation and Growth*, Praeger Press, Westport, USA:CT, 1994.

[4] BERR, *Strategy for Sustainable Construction, Department for Business Enterprise and Regulatory Reform*, UK: HMSO, 2008.

[5] A. Blyth, "Business behaving responsibly", *Director*, vol. 59, no. 1, pp. 30, 2005.

[6] *Corporate Social Responsibility ISO 26000:2010(E)*, International Standards Organisation (ISO), Switzerland: Geneva, 2010.

[7] *AA1000 AccountAbility Principles Standard 2008*, London, UK, 2008.

[8] IISD. (April 2011). *Corporate social responsibility (CSR).* International Institute for Sustainable Development. [Online]. Available: http://www.iisd.org/ business/ issues/sr.aspx

[9] GRI, *Sustainability Reporting Guidelines*, Version 3.1, Global Reporting Initiative (GRI), The Netherlands: Amsterdam, 2010.

[10] Good Corporation, *Good Corporation Standard*, The GoodCorporation, Institute of Business Ethics, UK: London, 2010.

[11] Accounting for Sustainability, *Connected Reporting in Practice: A Consolidated Case Study*, The Prince's Accounting for Sustainability Projects, UK: London, 2009.

[12] SAI, *Social Accountability 8000 (SA8000)*, Social Accountability International (SAI), USA: NY, 2008.

[13] A. Mees and J. Bonham, "Corporate social responsibility belongs with HR", *Canadian HR Reporter*, vol. 17, no. 7, pp. 11, 2004.

[14] M. E. Porter, M. R. Kramer, and S. Zadek, "Redefining Corporate Social Responsibility," *Harvard Business Review*, February 2007.

[15] P. Booth, *Corporate and Social Responsibility*, Institute of Economic Affairs, Blackwell Publishing, UK: Oxford, 2009.

[16] M. E. Porter and M. R. Kramer, "Strategy and Society: The Link Between Competitive Advantage and Corporate Social Responsibility," *Harvard Business Review*, December 2006.

[17] E. C. W. Lou, A. Lee, and G. Mathison, "Recapitulation of Corporate Social Responsibility (CSR) for Construction SMEs in the UK," C.O. Egbu and E.C.W.Lou (eds), in *Proc. 27th Annual ARCOM Conference*, Bristol, UK, 2011.

[18] Business Link. (April 2011). *Corporate social responsibility: Introduction*. [Online]. Available: http://www.businesslink.gov.uk/bdotg/action/layer?r.i= 1075408480&r.l1=1074404796&r.l2=1074446322&r.l3=1075 408468&r.s=sc&r.t= RESOURCES&topicId=1075408468

[19] European Commission, *The New SME definition, User guide and model declaration*, Enterprise and industry publication, European Commission, Belgium: Brussels, 2005.

[20] WBCSD, *The Business Case for Sustainable Development: Making a Difference Towards the Johannesburg Summit 2002 and Beyond*, World Business Council for Sustainable Development (WBCSD), Switzerland: Geneva, 2002.

[21] BSR, *BSR Report 2009: Innovating for Sustainability*, Business for Social Responsibility (BSR), USA: NY, 2009.

[22] CIRIA, *ENGAGE: How to Deliver Socially Responsible Construction – A Client's Guide*, C627 Report, Construction Industry Research Information Association, UK: London, 2004.

[23] KTP. (June 2011). *What is a Knowledge Transfer Partnership?* [Online]. Available: http://www.ktponline.org.uk/what-is-a-knowledge- transfer-partnership

[24] DEFRA, *The Air Quality Strategy for England, Scotland, Wales and Northern Ireland*, Department for Environment, Food and Rural Affairs in partnership with the Scottish Executive, Welsh Assembly Government and Department of the Environment Northern Ireland, vol. 1, July 2007.

[25] DEFRA, *The Air Quality Strategy for England, Scotland, Wales and Northern Ireland*, Department for Environment, Food and Rural Affairs in partnership with the Scottish Executive, Welsh Assembly Government and Department of the Environment Northern Ireland, vol. 2, July 2007.

[26] BRE. (October 2011). *What is BREEAM?*, BRE Environmental Assessment Method, Building Research Establishment (BRE), Watford, [Online]. Available: http://www.breeam.org/page.jsp?id=66

[27] CCS. (October 2011). *What we do*, Considerate Constructors Scheme (CCS). UK: London. [Online]. Available: http://www.ccscheme.org.uk/

[28] The Greenhouse Gas Protocol, *A Corporate Accounting and Reporting Standard*, Revised Edition, World Business Council for Sustainable Development & World Resources Institute, Switzerland.

[29] DEFRA, *2010 Guidelines to DEFRA / DECC's GHG Conversion Factors for Company Reporting: Methodology Paper for Emission Factors*, Department for Environment, Food and Rural Affairs (DEFRA) & Department of Energy and Climate Change (DECC), Crown Copyright, London, October 2010.

[30] The Carbon Trust, *Conversion Factors*, Fact Sheet, Energy and carbon conversions, March 2011.

[31] *The Waste (England and Wales) Regulations 2011*, no. 988, Crown Copyright, The Stationary Office, UK: London, 2011.

[32] *Site Waste Management Plans Regulations 2008*, Environmental Protection England, no. 314, HMSO, London, UK, 2008.

[33] *Clean Neighbourhoods and Environment Act 2005*, HMSO, London, http://www.legislation.gov.uk/ukpga/ 2005/16/ contents

[34] SmartWaste. (October 2011). Building Research Establishment (BRE). Watford. [Online]. http://www.smartwaste.co.uk/

[35] *Sustainable procurement – making it happen*, Waste and Resources Action Programme (WRAP), Improvement and Development Agency (IDeA) & Society of local authority Chief Executives and Senior Managers (SOLACE), SOLACE, London, 2009.

[36] *BES 6001: Issue 2.0*, Framework Standard for the Responsible Sourcing of Construction Products, BRE Environmental & Sustainability Standard, Building Research Enterprise (BRE), Watford, UK, 2009

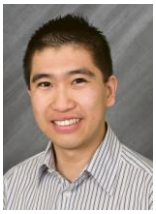
[37] BRE. (January 2012). *Green Guide to Specification*, Building Research Establishment (BRE). UK: Watford. [Online]. Available: http://www.bre.co.uk/greenguide/podpage.jsp?id=2126

[38] BRE. (January 2012). *Green Book Live*, Building Research Establishment (BRE). UK: Watford. [Online]. Available: http://www.greenbooklive.com/

[39] BRE. (January 2012). *Red Book Live*. Building Research Establishment (BRE), UK: Watford. [Online]. Available: http://www.redbooklive.com/

[40] WRAP, *Choosing construction products*. Guide to the recycled content of mainstream construction products, Version GB 4.1, Waste & Resources Action Programme (WRAP), UK: Oxon, 2008.

[41] WRAP, *Reclaimed Building Products Guide*, Waste & Resources Action Programme (WRAP), UK: Oxon, 2012.



Eric C.W. Lou has a spectrum of expertise in the construction industry, ranging form strategic policing, analytics and ICT – in areas of construction ICT, business strategies, e-readiness and corporate responsibility. Eric is expected to complete his PhD by mid-2012. He currently holds an MSc in IT in Construction with Distinction from the University of Salford, UK (2004); BSc (Hons) in Computer Science majoring computer graphics form Universiti Teknologi Malaysia (2003); and an Advanced Diploma in Quantity Surveying from Stamford College-University of Northumbria in Newcastle, UK (1999).

He is now working in the area of social, economic and environment in Corporate Responsibility through integrated ICT – incorporating international standards, such as ISO26000, AA1000, GRI, BREEAM; and national standards by the Carbon Trust, DEFRA, BRE and CIRIA, among others. His previous experience (RESEARCH MANAGER at the University of Salford, UK) sees Eric helping to distill and shape future research strategy; identifying research synergies; liaising with leading senior researchers; and working with academic and industrial networks etc. He also assisted in research analysis and data collection (RAE 2008). His earlier experience (SENIOR INFORMATION OFFICER at CIDB E-Construct, Malaysia) is related to the Construction Industry Development Board of Malaysia and the Public Works Department (developing National master plans and strategies). He has helped to develop Malaysia's National E-Tendering Initiative, and has been involved in procuring several other high level Reports. He has also published extensively in journals and presented in conferences worldwide. His research interests encompass construction ICT, business strategies, e-readiness and corporate responsibility.

Mr Lou's work has won the UK North West Regional Construction Awards 2012 in the Business Innovation category and the finalist in the Young Achiever of the Year Award. Mr Lou is the 'Researcher of the Year 2009' awarded The Research Institute for the Built and Human Environment (BuHu), University of Salford, UK.

Angela Lee graduated with BA (Hons) Architecture at the University of Sheffield, UK (1998) and PhD at the University of Salford, UK (2002).

She is currently Reader at the University of Salford, UK, and her roles within the School of the Built Environment are Director of Postgraduate Taught Studies and Programme Director of the BSc (Hons) Architectural Design and Technology course. Her research interests centre around design management, process management, performance management and nD modelling. She has published over 200 journal and conference papers, including 4 books.

Dr Lee is also Editor of the Built Environment Review, an open access journal dedicated to postgraduate research.

Gill Mathison is a Member of the Institute of Public Relation (IPR) and graduated from the University of Central Lancashire, UK.

She is the Director at Create Construction Ltd, responsible for strategic planning, focusing primarily on the company's positioning and communication strategy, including developing its marketing and public relations activities. She is also the champion for sustainability and corporate social responsibility within the organisation. She was the HEAD OF MARKETING & PR at Blackpool Pleasure Beach and MANAGING DIRECTOR at Blackpool Football Club.