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


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**An examination of the relationship between skills
development and productivity in the construction industry**

A dissertation thesis submitted in partial fulfilment of the requirements for the award
of the Doctor of Engineering degree at Loughborough University

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Abstract

In recent years, the UK government skills policy has emphasised the role of workforce skills development as a key driver of economic success and improving productivity across all sectors of the economy. The importance of skills (as a vehicle for enhancing productivity performance) is highlighted within numerous government reports, such as Skills White Papers (2003 and 2005), in addition to the Leitch Review of Skills (2006) – which coincided with the outset of this research. Thus, the aim of this research was to examine the relationship between skills development and productivity in the construction industry in order to assess the assumptions of government skills policy in the context of the sector.

A multi-method approach was adopted in this research. This involved the analysis of: official construction statistics, levy/grant and financial accounts data of construction companies, in addition to a telephone survey. The main findings of the research are published in five peer reviewed academic papers, demonstrating the tenuous nature of the relationship between skills development and productivity performance, particularly when considering the heterogeneous nature of the construction industry. Government claims about the mono-causal relationship between skills and productivity should be treated with caution. A simple boost in qualification levels or participation rates of training is unlikely to lead to productivity improvements in the construction sector.

However, skills development and training activities needs to be targeted and focused if the desired outcome of enhancing productivity performance is to be achieved. Construction companies needs to be proactive in addressing the skills and training needs of their business through drawing on the various support available through CITB-ConstructionSkills training grants or participating in appropriate skills/training initiatives, such as apprenticeship schemes. The provision of ‘productivity-based’ training grants should be considered by CITB-CS in order to prompt construction companies to consider training as a plausible means for enhancing their productivity performance.

Finally, the recommendations presented in this thesis and areas for further research sets-out the potential way forward in terms of advancing knowledge in this area.

Keywords: *Skills development, Productivity, Construction Industry and Policy.*

Preface

The research presented in this thesis was conducted to fulfil the requirements of the Engineering Doctorate (EngD) programme at the Centre for Innovative and Collaborative Engineering (CICE), Loughborough University. The EngD is a doctoral level research, equivalent to a PhD, but within an industrial context. This means that it has to be driven by the business needs of the sponsoring company and as such the information produced through the EngD is envisaged to have practical implication.

The EngD is assessed on the basis of a thesis comprising at least three (but not more than five) research publications and/or technical reports. Presented within this thesis are 3 journal papers and 1 conference papers authored by the researcher. Each paper is referenced by a Paper Number (1 to 4) and they are referred to in the body of the thesis. It has to be noted that the papers should be read in conjunction with this thesis. Whilst there are 4-key papers that forms the scope of this EngD discourse, other academic papers, internal research reports for the industrial sponsor (CITB-CS), and articles for CICE were produced over the course of this EngD. A full list of all outputs produced is shown in the following page. The papers used in the EngD discourse are highlighted.

List of EngD papers¹

REFEREED JOURNAL PAPERS

Abdel-Wahab, MS, Dainty ARJ, Ison SG, Bowen, P. and Hazlehurst, G. (2008) Trends of skills and productivity in the UK construction industry, *Journal of Engineering, Construction, and Architecture Management (ECAM)*, **15**(4), pp.372-382.

Abdel-Wahab, MS, Dainty ARJ, Ison SG, and Hazlehurst, G. (2008) An exploration of the relationship between training grants and profitability of UK construction companies, *International Journal of Training and Development (IJTD)*, **12**(3), 188- 205.

Abdel-Wahab, MS, Dainty, ARJ, Ison, SG and Hazlehurst, G (2008) The participation of Small-to-Medium Enterprises in skills and training initiatives in the UK construction industry: implications for skills policy and construction companies, *Construction Information Quarterly (CIQ)*, **10** (3), 116-121.

REFEREED CONFERENCE PAPERS

Abdel-Wahab, MS, Dainty ARJ, Ison SG (2008) Insights into the overlap between ConstructionSkills and other Sector Skills Councils (SSCs), 24th Annual ARCOM conference, 1-3 September, University of Glamorgan, Cardiff, Wales.

Abdel-Wahab, MS, Dainty, ARJ and Ison, SG (2006) How Productive is the Construction Industry? In Boyd, D (ed) proceedings of the 22nd Annual ARCOM Conference, 4-6 September, Birmingham, UK, Vol.1, pp11-19, ISBN 0-9552390-0-1.

Abdel-Wahab, MS, Dainty, ARJ and Ison, SG (2006) A review of the relationship between skills and productivity in construction. In Proceedings of the Joint CIB W065/W055/W086 Symposium – Construction in the XXI Century: Local and Global Challenges (R Pietroforte, E DeAngelis and F Polverino (eds) Rome, 18-20 October, pp13-13, ISBN: 88-495-1339-9.

Abdel-Wahab, MS, Dainty ARJ, Ison SG, Bryer, L. and Hazlehurst G. (2005) Productivity, Skills, Training: a problem of definition? Proceedings of the Second Scottish Conference for Postgraduate Researchers of the Built and Natural Environment, 207-215, 16th - 17th November 2005, Glasgow Caledonian University, Glasgow, UK. ISBN 1-903661-82-X.

OTHER PAPERS/ARTICLES

Abdel-Wahab, MS, Hazlehurst, G., Dainty ARJ, and Ison SG (2005) The relationship between skills and productivity ARCOM (Association of Researchers in Construction Management) Doctoral Workshop on Skills, Training and Development in the Construction Industry, School of the Built Environment, Northumbria University, 30 November 2005.

Abdel-Wahab, MS (2006) The Swedish EngD: lessons to learn, Newsletter, Centre for Innovative and Collaborative Engineering (CICE), Loughborough University, Winter 2006.

Abdel-Wahab, MS (2008) Thoughts of a final year RE, Newsletter, Centre for Innovative and Collaborative Engineering (CICE), Loughborough University, Spring 2008 edition.

¹ The papers highlighted form the body of this thesis.

Used Acronyms/Abbreviations

ARCOM	Association of Researchers in Construction Management
CIQ	Construction Information Quarterly
CITB-CS	Construction Industry Training Board - ConstructionSkills
DfES	Department for Education and Skills
ECAM	Engineering Construction and Architecture Management
ECITB	Engineering Construction Industry Training Board
FAME	Financial Accounts Made Easy
GSWP	Grant Scheme Working Party
GVA	Gross Value Added
HRM	Human Resource Management
IJTD	International Journal of Training and Development
ITBs	Industrial Training Boards
ITCs	Industry Training Councils
KPIs	Key Performance Indicators
LSC	Learning and Skills Council
NIESR	National Institute of Economic and Social Research
NSTOs	Non-Statutory Training Organisations
NTOs	National Training Organisations
NVQs	National Vocational Qualifications
ROI	Return-on-Investment
SfBN	Skills for Business Network
SMEs	Small-Medium sized Enterprises
SSA	Sector Skills Agreement
SSC	Sector Skills Councils
SSDA	Sector Skills Development Agency
UK CES	UK Commission for Employment and Skills

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Chapter 1: Introduction

1.1 Introduction

This Chapter sets out the background to the research. It commences with a brief overview of the construction industry along with the skills and productivity challenge. The scope and justification of the research undertaken is discussed in relation to its industrial context and the structure of the thesis is presented in order to provide guidance and direction for the reader.

1.2 An overview of the construction industry

1.2.1 Output and Employment

The output of the construction industry has been consistently growing (with the exception of a slight dip in 2005) since the recession in the early 1990s – with an average annual growth rate of approximately 2.3%. This has been matched by an overall increase in the size of the construction workforce from 1.8 million in 1995 to 2.3 million in 2007. However, the industry’s output has been traditionally characterised by its cyclical nature, i.e. ‘Boom-Bust’ cycle – as seen in Figure 1. The volatility of the industry’s workload was associated with a similar cyclical change in the size of the construction workforce.

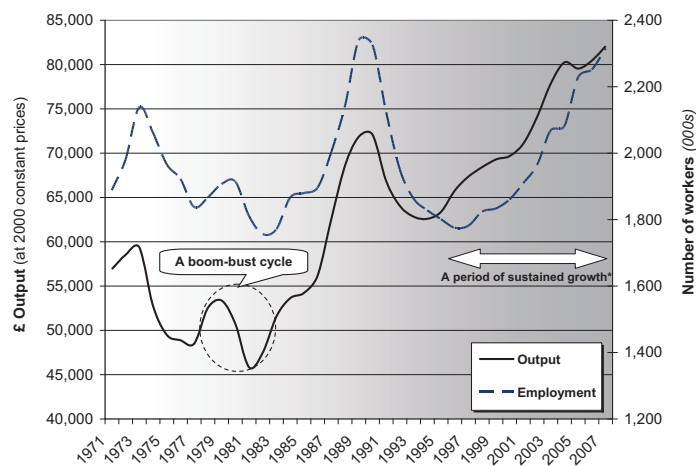
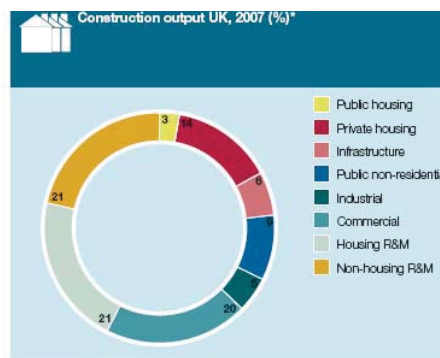


Figure 1: Output and Employment (1971-2007)
Sources: DTI and LFS
Construction industry is defined according to SIC45

The last recession in the construction industry took place in the early 1990s. This was preceded by a sudden tightening of monetary policy in 1988 which affected both the housing and property markets, which triggered the recession that afflicted the industry throughout this period (Hillebrandt *et al.*, 1995). This demonstrates that the construction industry is prone to the wider economical climate in which it is operating.

1.2.2 Industry structure

Employment in the construction sector is heavily skewed towards smaller businesses and self-employed. According to construction SME statistics (2006), SMEs account for 83% of employment within the sector and produce around 68% of the sector's output. However, self-employed or sole proprietors account for 40% of the construction workforce (LFS, 2006). It can be argued that construction can be regarded as a large industry mainly comprising small to medium sized companies (Langford and Male, 2001; Stocks and Male, 1991). Moreover, the construction industry is comprised of the following sub-sectors: repair and maintenance (R&M), housing, infrastructure, commercial and industrial – as seen in Figure 2.



Note: *2007 is an estimate

Figure 2: Construction industry sub-sectors
Source: Construction Skills Network (CSN), 2008

According to recent CSN (2008) projections, it appears that the infrastructure sector was the most buoyant with an average annual forecasted growth of 5.7% over the next 4-years*. This could be explained by a number of large-scale projects that are underway or planned, such as the Thames Link, and Terminal East scheme at Heathrow, and the redevelopment of Birmingham New Street station. This discussion depicts the heterogeneous nature of the construction industry which stem from its diverse employment and sub-sectoral structure.

1.3 The skills and productivity challenge

Government reports, aimed specifically at the construction industry, found that the industry's productivity performance, workforce training and skills shortages are amongst the key challenges facing the construction sector historically (see Murray and Langford, 2003). As such, concerns about the construction workforce and the level of training in the industry are not new and could be traced back to the White Paper entitled 'Industrial Training: Government Proposals', published in 1962, which argued that training is barely adequate and some definitely unsatisfactory. It recommended that Industrial Training Boards (ITBs) should be established in order to take on the responsibility of training across different industries including construction. There was a concern that 'poaching' skilled labour meant that firms may lack the necessary economic incentive to invest in training people who, once trained, may leave them for other jobs. The government wanted to apply a shock to those firms that were neglecting training and poaching skilled labour and a levy system seemed an appropriate measure (CITB, 1998).

* These were the most up-to-date projections at the time this thesis was written, albeit recent economic slow down across all sectors of the economy including the construction industry.

As a result, the Industrial Training Act in 1964 gave the CITB the statutory power to impose a levy on construction companies. The purpose was to support the quality and training within the industry as well as sharing the cost of training more evenly between firms. Given that the industry is largely regarded as labour intensive, it is notable that workforce skills development and training remain a key challenge facing the industry that could potentially impede its productivity performance. This is evident when considering the recent findings of the Construction Industry Trade Survey (2008) which indicated that firms continue to be affected by turning down work and experiencing delay on projects due to labour shortages across various construction trades, such as steel benders and fixers; plasterers and carpenters and joiners.

As such, the industry's reliance on migrant workers became inevitable. This may be a result of the industry traditionally being characterised by low participation levels of training when compared to other industries, in addition to its failure to attract and retain enough new recruits (See Dearden et al., 2000; Morton, 2002). Indeed Clarke and Wall (1996) found that the construction process (on house building projects) in the UK depends on a lower level of skill than in Germany, which in turn leads to lower productivity levels when compared to Germany. Arguably, the labour force or the human resource in construction is the main engine driving other areas of change in the industry. If workers are not equipped with the necessary skills, it is difficult to see how they can perform competently, productively and safely on construction projects.

1.4 The industrial-sponsor context

CITB-CS is the industrial sponsor for this EngD research. It has had a long and constantly changing history, where its name has changed over time (see Figure 3 below) but its function has remained in essence the same which is to encourage and support training activities in the construction industry. ITCs had no executive power, but would ‘encourage and if necessary exhort’ firms to do better. Thus, ITBs were formed and they had a statutory power to impose levy.

ITBs were abolished in the early 1980s and replaced with Non-Statutory Training Organisations (NSTOs) except for the Engineering and Construction Boards which retained their levy powers since their existence was backed-up and supported by employers. They were expected however to undertake the same activities as NSTOs, which were later modified and resulted in having around 120 ITOs. Clearly, the number of ITOs was excessive and not manageable, and in an attempt to reduce it through mergers with similar sectors, NTOs were launched which significantly reduced the number of ITOs to around 80.

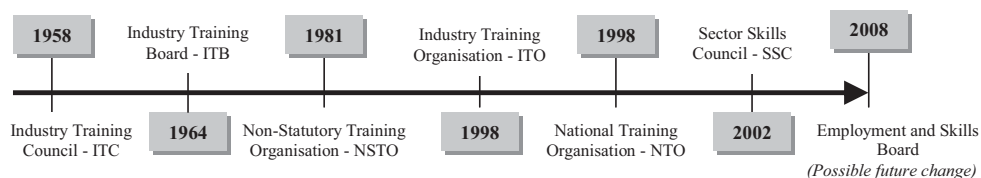


Figure 3: History of CITB-CS

It was believed, however, that NTOs did not have the desired impact on the UK’s economy as its productivity continued to lag behind other countries such as France, Germany and the USA. Bartley (2002) explained that NTOs were abolished and replaced with SSCs because the NTO network did not deliver the fundamental changes that were needed for a step change in skills and productivity.

CITB-ConstructionSkills (CITB-CS), a name which reflects both its retained ITB status along with its new SSC remit, has a licensing agreement with the Sector Skills Development Agency (SSDA²) to operate as a SSC. A SSC has four key objectives in relation to the construction industry: address skills gaps and shortages; improve its performance and productivity; provide opportunities for training and development; and support the development of training standards and curricula (ConstructionSkills, 2007a). Currently, CITB-CS activities fall into the following broad areas:

1. Training grant scheme which provides financial support to companies undertaking various training activities;
2. Supporting and promoting a plethora of initiatives aimed at encouraging employers to participate in various training activities, such as: Apprenticeship Schemes; CSCS; and INSPIRE scholarships.
3. Acting as a major awarding body for construction qualifications (NVQs) whilst ensuring that the qualification standards meet the industry requirements.

These activities presented opportunities for narrowing down the focus of the EngD research scope – as will be discussed in Chapter 3.

² *SSDA was replaced by the UK CES from 1 April 2008.*

1.5 The author

The author worked as a Researcher at the Research and Development (R&D) department in the Skills Strategy Directorate at CITB-CS head office in Bircham Newton, Norfolk from 2004-2008. As a member of the R&D department, the author has dealt with ad-hoc research requests to internal and external stakeholders.

These included: responding to an open consultation on the Regional Economic Strategy (RES) developed by the South East of England Development Agency (SEEDA); preparing a response to a Parliamentary Question (PQ) on the industry's capacity of building new nuclear power plants; supporting the Secretary to the Board of Directors of CITB-CS to address strategic areas of the business, such as regulatory impact assessment of the training levy order. These activities have enabled the author to gain better insights into the organisation and thus embedding the EngD research within its industrial context. At the same time, it helped to tap into the wealth of knowledge and information available in the organisation which aided in directing the EngD research.

1.6 Aim and objectives

The aim and objectives of this EngD research, which stem from CITB-CS role as a SSC, were formulated in order to address the following research questions: how workforce skills development is related to productivity performance in the construction industry? What implications does this have to the current government skills policy? Listed below are the aim and objectives of the research which is followed by the discussion of the full justification for conducting the research in light of both the existing literature and given the industrial context of the EngD.

- **Aim:** To examine the relationship between skills development and productivity in the construction industry in order to inform future skills policy.
- **Objectives:**
 1. Examine the trends of skills and productivity within the construction industry; (Paper 1 and 2)
 2. Explore the relationship between training grants and profitability of construction companies; (Paper 3)
 3. Survey companies' participation in skills and training initiatives; (Paper 4)
 4. Provide implications for government skills policy. (EngD thesis).

1.7 Justification of the research

CITB-CS espoused role as a SSC requires them to demonstrate the impact of skills development and training in the construction industry on the overall productivity performance of the construction sector. Currently, there is a set of Key Performance Indicators (KPIs), see Appendix 6, which are used to demonstrate the potential effect of skills development and training on productivity performance in the industry.

It is not known how much the effect of such improvements, especially in productivity performance, could be attributable to skills development and training activities. This becomes problematic when considering that the existing construction literature does not go beyond identifying skills and training as important factors for improving productivity, i.e. merely stating that skills and training are “good” for the industry (Mojahed, and Aghazadeh, 2007; Butler *et al.*, 2003; Rojas and Aramvareekul, 2003; Egan report, 1998; Lavendar 1996). It is not clear what training activities are related to productivity performance, and how much impact might be there on productivity.

Galindo-Rueda and Haskel (2005) argued that a link between higher skills and higher productivity is both theoretically and intuitively appealing, yet there is a surprising lack of evidence at the company level for this relationship, at least within the UK.

Moreover, Zwick (2002) argued that the “correlation between training and firm productivity is not clear a-priori and is still open for empirical evaluation”. Reviewing the HRM literature, it becomes clear that the relationship between HRM and performance remains the ‘Holy Grail’ for both academics and practitioners, which is often plagued by methodological difficulties (see for example, Wall and Wood, 2005).

Thus, the overarching aim of the EngD research was to examine the relationship between skills/training with productivity and/or performance in the construction industry in order to inform future skills policy. The idea was to collect prima facie evidence of how skills and productivity could be related. A starting point (objective 1) was to examine the trends of skills and productivity in the construction industry over the past decade to report if there is any notable association in light of the officially published statistics.

As evidence of the integration of this EngD objective with the needs of CITB-CS, it was included in the SSC KPI³ Table, see appendix 6. The scope of the EngD research, set-out in the SSC KPI Table, was aimed at: first, to review various productivity KPIs for the construction industry, and second to examine the trends of skills and productivity in construction with a specific focus on its sensitivity to the wider economic context in which it is operating. Clearly, this scope was squarely aligned with objective 1 of the EngD research.

³ KPI Table sets out the performance targets of SSC as per its licensing agreement with the SSDA.

As for objective 2, given that CITB-CS retains a levy/grant scheme, it was sensible to make use of the wealth of internal data available in the levy/grant register especially that the data has never been used before in relation to productivity performance of construction companies. More importantly, it was thought that this might potentially provide an additional justification or strengthen the evidence base underlying the existence of the levy/grant system. This should be seen as an area of strategic importance to the business as the levy order is renewed annually and CITB has to submit evidence to the House of Parliament to justify the existence of the levy/grant system – which includes the backing and support of the majority of construction employers. The importance of objective 3 of the research becomes apparent when considering that there has been a plethora of skills/training initiatives in recent years. These initiatives are regarded as the training products and services offered by CITB-CS and thus establishing the level of awareness and penetration of these products and services is paramount for effective responsiveness to the industry's skills needs as well as potentially helping to inform planning across different areas of the business, such as the Marketing and Communication Department. Thus, this was the intended contribution and justification for this specific objective of the EngD research.

The scope of this research covered CITB-CS' activities 1 and 2 – mentioned in section 1.3 above – which also helped in maintaining a focus for the research and make it more manageable. It becomes evident that the scope of the research is grounded in its industrial context which is the fundamental difference between an EngD as opposed to a PhD. This was vital in order to ensure that the research would add value and provide practical recommendations to the business.

Objective 4 of the research followed logically from the previous objectives in order to synthesise the findings of the previous objectives and provide implications/recommendations to government skills policy. It has to be noted that the policy environment in which the research has been undertaken is quite dynamic and rapidly changing. As such, a key challenge was to ensure that the EngD research is in-tune with the most recent policy developments and debates. It follows that the next Chapter discusses the government skills policy with specific reference to the Leitch Review (2006) – the publication of which coincided with the undertaking of this research.

1.8 Structure of the thesis

This thesis documents the work undertaken in this research project. It is structured as follows:

Chapter 1 introduces the background to the EngD project given its industrial context (CITB-CS). The Chapter defines the scope of the research in relation to: research questions being addressed, aims, objectives, justification for the research.

Chapter 2 provides a synthesis of the government skills policy in recent years particularly in relation to the Leitch Review of skills which was developed during the period of undertaking this research project. It focuses on the perceived role of skills in relation to productivity in the government skills policy arena along with the remit of SSCs.

Chapter 3 reviews a range of research methods and explains those used within the scope of this research along with their justification.

Chapter 4 details the tasks undertaken in order to meet the aims and objectives of the research through discussing the key findings and outputs of the research with reference to the peer-reviewed papers along with the contribution of each to the research scope.

Chapter 5 concludes by summarising the key findings of the research, provides implications for the industry, the industrial-sponsor, and recommendations for government policy. It also presents areas for further research.

Appendices 1 to 5 include the four peer-reviewed published papers that support this research. These papers are an integral part of, and should be read in conjunction with, this thesis.

Chapter 2: Government Skills Policy

2.1 Introduction

This Chapter provides an overview of government skills policy along with a focus on skills and productivity in the UK economy. Moreover, the government sectoral approach to skills and productivity is also discussed. This is important in setting-out the scope of the government skills policy which is being addressed by the EngD research.

2.2 An overview of skills policy

The government skills policy has two objectives, namely, social justice and economic success, which is at the heart of its vision for the future prosperity of Britain (Skills Strategy, 2005). These objectives are subsequently discussed, which is followed by setting-out the scope of the government skills policy addressed by the EngD research.

2.2.1 Social justice

Skills development is regarded as an effective way of tackling family poverty, encouraging people to strive for a better life, and increasing social mobility (World Class Skills Report, 2007). Moreover, the provision of equal opportunities of learning to everyone, irrespective of their background, ethnicity, gender, faith, disability or postcode, is regarded as a contributor to having a fair society. For example, the LSC developed a strategy for the planning and funding of learning provision for those with learning difficulties and/or disabilities, which includes the collection and analysis of information from local authorities about the costs associated with supporting learners with learning difficulties and/or disabilities.

This information helps in informing the LSC's development of a planned approach for young people in the FE system (LSC, 2006). Furthermore, the LSC 'Skills for Life', which is the national strategy for improving adult literacy and numeracy in England, helps to equip people with the basic skills they need to be employable. There are a number of projects or initiatives which are being run to implement the 'Skills for Life' strategy, such as 'Link Up Project' (where volunteers help to support adults with their language, literacy and numeracy skills in deprived communities in England), and 'Move On' (which is a national project aimed at helping adults pass the national tests in literacy and numeracy) (Skills for Life, 2008). Clearly, there is a lot of effort expended in helping people to develop their basic literacy and numeracy skills so that they can provide themselves with the opportunities to become employable and have better life prospects.

2.2.2 Economic success

The second key objective of the government skills policy is to develop skills in the economy in such a way that would bring about economic success, such as productivity improvement. According to the Leitch Review (2006), if the UK developed a world class skills base this will result in massive benefits to the UK economy, through higher productivity and employment. The same view was echoed in the government skills strategy, which stated that 'national and regional productivity is enhanced through high-skilled, well-rewarded employees working in companies committed to long term investment and leading the world in their business sectors' (Skills Strategy, 2005).

Thus, the government is investing heavily in schools, colleges, and universities, so that they can equip young people and adults to succeed (Skills Strategy, 2005). A better skilled workforce could mean that employers could attain better productivity levels, become more competitive and potentially more profitable. According to John Denham, Secretary Of State for Innovation, Universities and Skills, “the business case for investing in skills stands in its own right” and he added that “it makes sense for government to work with employers purely for the economic benefits and improved competitiveness it will bring” (Williams, 2007).

Attempts for promoting skills as a vehicle for attaining productivity improvements is evident through the LSC’s flagship programme - Train to Gain (which was available before the Leitch Review was commissioned); in addition to the promotion of Leadership and management skills and level 3 qualifications to employers. ‘Train to Gain’ aims to encourage companies to undertake more training activities in line with their business activities, whilst the promotion of management and leadership skills emanates from the belief that it brings about potential productivity gains. Thus, the government set-up a ‘Leadership and Advisory Panel’, which is tasked with gaining an understanding of the breadth and depth of knowledge about how leadership and management drives performance and to use this to build a convincing business case for investment in leadership and management learning (Leadership and Management Advisory Panel, 2006).

Moreover, there are other attempts aimed at employers shaping the provision and content of qualifications. For example, the Construction Qualification Strategy (CQS) is aiming to identify the sector's key requirements for qualifications, units, pathways, qualification development and other lifelong learning provision; in addition to determining how well existing qualifications, units and other learning provision meets identified sector needs (ConstructionSkills, 2007b). As a demonstration of the important role of employers in shaping the provision of qualifications, the Leitch Review (2006) recommended that the government funding support should be allocated or directed to only those qualifications that are supported or endorsed by employers.

2.2.3 Scope of government skills policy addressed by the EngD

It appears from the above overview that the scope of government skills policy is wide ranging and complex – which is unrealistic to cover within the scope of one research project. The focus of this thesis therefore is concerned with the economic success element of government skills policy, namely productivity. This focus is justified given the industrial nature of the EngD programme, which is sponsored by the CITB-CS, Sector Skills Council for Construction that has a remit to influence skills development in the industry in order to bring about productivity gains in the sector, as discussed in Chapter 1. Thus, the aim of the EngD is to examine the relationship between skills and productivity in the construction industry in light of the productivity element of government skills policy.

The remainder of this Chapter discusses the government sectoral approach to skills and productivity in the UK economy. This discussion is important in providing further justification for the scope of government skills policy, namely productivity, addressed by the EngD research. At the same time, it sets-out the government approach in addressing the skills and productivity agenda.

2.3 Skills and productivity in the UK economy

The productivity performance of the UK economy has continued to be at the centre of government policy over the past decade. As described by the Pre-Budget Report (1998), “Productivity ... is a fundamental yardstick of economic performance.... We are not as productive as our major partners and the extent of our under-performance is very substantial.... tackling it must be a central national priority”. Moreover, the Budget Report (2005) mentioned that “despite some progress in the UK productivity performance, there remains a significant gap with the US”. Accordingly the Government’s strategy focuses on five key drivers of productivity performance, namely: improving competition, promoting enterprise, supporting science and innovation, raising UK skills, and encouraging investment (Budget Report, 2005).

However, the government emphasises the role of skills as the driver for attaining productivity performance, which is evident by the government statement that “without increased skills, we would condemn ourselves to a lingering decline in competitiveness, diminishing economic growth and a bleaker future for all” (Leitch Review, 2006; p.1). This statement suggests that the government emphasises the role of skills development as a key lever for bringing about economic success. A key indicator of economic success or competitiveness is the UK productivity performance.

Considering the evidence underpinning the importance of skills, NIESR (2002) estimated that as much as one-fifth of the productivity gap between UK and Germany is a result of the UK's relatively poorly skilled workforce - using qualification levels as an indicator of skills. Moreover, Dearden *et al.* (2000) found that an increase in the sector-wide training rate of 5% is associated with a 4% rise in productivity – measured by Gross Value Added (GVA) per worker. Spilsbury (2002) also reported that 65% of employers in England attributed an increase in their firm's productivity due to increased participation levels in training. At the firm level, Haskel and Hawkes (2003) found that top performing manufacturing companies had workers with (on average) an extra qualification level than the workforce of the bottom performing companies in the manufacturing industry. These studies generally indicate that skills defined by qualification levels and training, had a positive effect on productivity/performance of both the economy and companies.

Given the important role played by skills in enhancing productivity performance, the Chancellor of the Exchequer and the Secretary of State for Education and Skills commissioned the Leitch Review in 2005 to identify the UK's optimal skills mix in 2020 to maximise economic growth, productivity and social justice, and to consider the policy implications of achieving the level of change required. In particular, the review was asked to: examine the UK's optimum skills mix in order to maximise economic growth and productivity by 2020; and consider the different trajectories of skill levels the UK might pursue. The Leitch Review (2006; p.3) claimed that 'UK skills base remains weak by international standards, holding back productivity, growth and social justice... there is a direct correlation between skills, productivity and employment.'

There was also a reiteration of the notion of ‘demand-led’, i.e. responding to employers’ needs, for training provision despite it being the theme in earlier government Skills White Papers (See DfES, 2003; DfES, 2005). Whilst this review was independent the government has taken on board the recommendation of that endorsed the findings and recommendations of the Leitch Review which is evident the government report title “World Class Skills: Implementation of the Leitch Review in England” – which published by DIUS in 2007.

2.4 Sectoral approach to skills and productivity

2.4.1 Sector Skills Councils

Sector Skills Councils (SSCs) were established in 2002 with a remit to provide employers with a unique forum to express the skills and productivity needs that are pertinent to their sector (SSDA, 2007). This sectoral approach is underlined by the idea that different sectors have different contributions to make in order to help in closing the UK productivity gap with the US and other European countries (France and Germany). O’Mahony and De Boer (2002) found that the ‘skills gaps are found most frequently in financial intermediation, construction, post and telecommunications and hotels and restaurants’.

Moreover, employer surveys (Hillage *et al*, 2002; Hogarth *et al*, 2001) showed that the largest proportions of skill shortage vacancies are in intermediate level jobs in skilled trades (e.g. in metals, electrical and construction) and associate professional and technical occupations (e.g. in health and social care). Additionally, Jaggar *et al*. (2005) argued that different sectors have different skills demands, even if the exact nature of these differences is still poorly understood.

The network of SSCs, namely Skills for Business Network (SfBN), is comprised of 25 SSCs, covering 85% of the activities in the economy. Below is a list and a brief description of SSCs:

Table 1: List of Sector Skills Councils (SSCs)

SSC	noitpircesd rotceS
Asset Skills	Property, housing, cleaning, facilities management
Automotive Skills	Retail motor industry
Creative and Culture Skill	Advertising, crafts, cultural heritage, design, music, performing, literary and visual arts
Energy & Utility Skills	Electricity, gas, waste management & water
e-Skills	Information technology, telecommunications and contact centres
Financial Services Skills	Financial services industry
GoSkills	Passenger transport
Government skills	Central government
Improve	Food & drink manufacturing & processing
Lantra	Environmental & land-based industries
Lifelong learning	Employers who deliver or support the delivery of lifelong learning
People 1st	Hospitality, leisure, travel & tourism
ProSkills	Process and manufacturing industry
SEMTA	Science, engineering & manufacturing technologies
Skillfast-UK	Apparel, footwear & textile industry
Skills for Health	All staff groups working in the NHS, independent & voluntary health
Skills for Justice	Custodial care, community justice & police
Cogent	Chemicals, nuclear, oil & gas, petroleum & polymer industries
ConstructionSkills	Construction industry
Skills for care and development	Social care, children and young people
Skills for Logistics	Freight logistics industry
SkillsActive	Active leisure & learning (temporarily omitted from analysis)
Skillset	Broadcast, film, video, interactive media & photo imaging
Skillsmart	Retail industry
Summit Skills	Building services engineering (electro-technical, heating, ventilation, air conditioning, refrigeration & plumbing)

Source: UK CES

Each SSC develops a Sector Skills Agreement (SSA) outlining how the SSC and employers will work with training providers and funders to secure the necessary supply of training for their specific sector and how this will be done. The key SSA targets for ConstructionSkills are shown in Exhibit 1 below.

<p>Improving Business Performance – increasing SMEs investing in training by 300% by 2010</p> <ul style="list-style-type: none">• Increasing the number of companies investing in training – with a threefold increase in the number of companies with a training plan and IIP• Developing management and leadership skills – with a £2m per year development pot• Supporting lifelong learning in construction including an expansion of Approved Graduate Training schemes and action learning CPD programmes• Developing skills for sustainability <p>Qualifying the Existing Workforce – over ¼ million to Vocational Qualification Level 2 by 2010</p> <ul style="list-style-type: none">• Intensifying and widening the industry’s Qualifying the Workforce Initiative – with a doubling to over 1 million workers covered by ‘licence to practice’ arrangements• Developing flexible training and qualification structures for specialist occupations – in partnership with product manufacturers• Assisting the effective integration of migrant workers – including meeting English language requirements <p>Recruiting Qualified New Entrants – almost ½ million by 2010</p> <ul style="list-style-type: none">• Improving understanding of the career opportunities in construction• Increasing apprentice completions and widening opportunities for onsite practice – increasing framework completions for 3,000 to 13,000 per year• Promoting diversity through local employment and training projects• Increasing quality applications for construction-related degree courses – with a £1m collaborative employer sponsorship pot
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Exhibit 1: SSA targets

Source: (*ConstructionSkills, 2008*)

Whilst each SSC has their own SSA, they should operate as a part of the SfBN. The purpose of the SfBN is to provide a forum of researchers across SSCs in order to share their research experience and work collaboratively on common research issues, in addition to providing a collective voice of the network across different government departments. The SfBN is envisaged to develop and become the authoritative source of Labour Market Intelligence (LMI), whilst utilising the national data collected by Government and its agencies (DfES, 2003).

The SfBN activities include: working on joint research projects funded and endorsed by the SSDA; an annual CPD conference; and quarterly meetings. Examples of the SfBN influence on LMI is evident through its contribution to the development of Migration Advisory Committee (MAC) proposals as well as providing a joint response to various government consultations, such as for the Labour Force Survey (LFS) questionnaire and SIC code revisions (See SSDA, 2007).

2.4.2 Sector Compacts

A sector compact is a non-contractual agreement between the Department for Innovation Universities and Skills (DIUS), the Learning and Skills Council (LSC) and a Sector Skills Council (or sector body) to work collaboratively to drive up demand for skills across England, such as through Train to Gain (LSC, 2008). Thus, sector compacts provide flexibilities for SSC whereby they can respond to the skills needs in their respective sectors. For example, each sector can develop their sector-specific plans for implementing existing Government Skills Pledge. Moreover, a report published by the LSC entitled ‘Train to Gain: A plan for Growth’ set out a series of “flexibilities” to ensure that Train to Gain evolve and continues to respond to feedback from employers. One of those flexibilities was to create sector compacts, aiming to identify the key changes needed by employers in a specific sector within Train to Gain in order to deliver increased volumes of learners and meet their specific skills challenges (LSC, 2008).

Thus, Sector Compacts are used to accommodate to the diverse needs of sectors, yet they also could contribute towards the attainment of the government PSA targets. The government have PSA (Public Service Agreement) targets⁴ for attaining its skills policy. The themes of PSA targets, in relation to the government skills ambitions, comprises: the proportion of people of working age achieving functional literacy and numeracy skills; proportion of working age adults qualified to at least full Level 2; proportion of working age adults qualified to at least full level 3; proportion of apprentices who complete the full apprentice framework; proportion of working age adults qualified to Level 4 and above; Higher Education participation rate (HM Treasury, 2007).

⁴ *PSA targets were developed in 1998 and they set out the key priority outcomes the Government wants to achieve in its next spending period. PSA targets are underpinned by a delivery agreement as well as performance indicators.*

Chapter 3: Research Method

3.1 Introduction

This Chapter sets-out the scope of the EngD research in terms of the aim and objectives along with the methods adopted for attaining each objective. It also provides a brief review of available research methods, in light of the scope of the research outlined, in addition to the justification of the research methods used given the industrial context of the research. There will also be a brief account of some of the methodological challenges faced.

3.2 Research design

Research design is the process of situating the researcher in the empirical world and connecting research questions to data (Denzin and Lincoln, 1994). There are five major types of research design, which include the following: experimental, cross-sectional, longitudinal, case study and comparative (Bryman and Bell, 2003).

Objective 1 adopted a cross-sectional approach where the productivity performance and skills profile was examined annually in order to report emerging trends. This approach was essential in order to capitalise on the wealth of existing construction statistics – which is often under-utilised in academic research (Neely, 2004).

Objective 2 has incorporated both longitudinal and comparative research design elements. The former enabled the studying of company's investment in training in relation to profitability over a 4-year period of time, whereas the latter enabled the comparison of companies profitability of two groups of companies, namely: those who claimed training grants consistently (through CITB-CS levy/grant scheme) as opposed to those who did not claim any training grants.

This type of design was possible through the creation of a new and unique company-level dataset (comprising of training grants data and financial performance measures) – which is discussed in detail later in section 3.6.3. It has to be noted that the adoption of this type of research design would not have been possible if the research was not undertaken in an industrial context – which is a distinctive characteristic of the EngD.

Objective 3 adopted a cross-sectional approach through surveying companies' participation in a range of construction-specific skills and training initiatives which were not compiled before in one single study. A telephone survey was used which is discussed later in section 3.6.4.

3.3 Qualitative versus quantitative approaches

The two main broad research classifications of research paradigms are: qualitative and quantitative. Table 2 below summarises the differences between the two paradigms. Whilst there is a classical debate on which of these methods is better, it is important to point out that this is dependent on the nature of the problem being investigated. Decisions about which kind of research paradigm to be adopted depends on the researcher's own experience and preference, the population being researched, the proposed audience for findings, time, money, and other resources available (Hathaway, 1995). Given the industrial context of the EngD research, the intended audience was the industrial sponsor because simply they contributed to funding the research.

According to CICE (2003) the main driver for the industrial sponsor funding the research is that it has the potential of affecting the performance of the company and thus has to be in the ‘mainstream’, not a ‘student’ project on the sidelines. Thus, the organisation’s main interest was to assess the impact of the various activities it undertakes in relation to skills and training activities and if this has any impact on the productivity performance of the construction sector.

Table 2: Features of Qualitative and Quantitative Research

Qualitative	Quantitative
"All research ultimately has a qualitative grounding" - Donald Campbell*	"There's no such thing as qualitative data. Everything is either 1 or 0" - Fred Kerlinger*
The aim is a complete, detailed description.	The aim is to classify features, count them, and construct statistical models in an attempt to explain what is observed.
Researcher may only know roughly in advance what he/she is looking for.	Researcher knows clearly in advance what he/she is looking for.
The design emerges as the study unfolds.	All aspects of the study are carefully designed before data is collected.
Researcher is the data gathering instrument.	Researcher uses tools, such as questionnaires or equipment to collect numerical data.
Data is in the form of words, pictures or objects.	Data is in the form of numbers and statistics.
Subjective - individuals' interpretation of events is important ,e.g., uses participant observation, in-depth interviews etc.	Objective – seeks precise measurement and analysis of target concepts, e.g., uses surveys, questionnaires etc.
Qualitative data is more 'rich', time consuming, and less able to be generalized.	Quantitative data is more efficient, able to test hypotheses, but may miss contextual detail.
Researcher tends to become subjectively immersed in the subject matter.	Researcher tends to remain objectively separated from the subject matter.

Source: (Neill, 2007); *Adapted from Miles and Huberman (1994, p. 40)

Working in a research and development department, there was a wealth of data available. It was essential to review the in-house data, which was predominantly quantitative, in order to learn more about the organisation as well as capitalising on existing data.

Furthermore, the statistical data published by the Office of National Statistics (ONS) was a valuable source of quantitative data especially that it has not been fully exploited in research, thus it was necessary to invest time in exploiting this data before asking members of the industry to provide yet more data (Neely, 2004).

3.4 Multi-method research

Multi-method research entails the application of two or more sources of data or research methods to the investigation of a research question or to different but highly linked research questions (Bryman, 2001). Dainty (2007) highlighted the importance of considering the research context when adopting a multi-method research approach. Whilst the use of various methods can be challenging, there is an onus on researchers to overcome such methodological difficulties which could potentially enhance the credibility of their work (Bryman, 2001). A multi-method research approach could also be classed as a 'complementarity' research strategy which means that two strategies, i.e. using different methods to collect data, are employed in order to dovetail different aspects of an investigation (Dainty, 2007; Flood and Jackson, 1991).

3.5 Adopted research process

Whilst the wealth of existing secondary data provided a rich resource for undertaking the research, it posed a challenge for narrowing down the focus of the research. Silverman (2005) described this situation in research as the ‘kitchen sink’ gambit. He explained that this is caused by the fact of having too many ideas buzzing around. Thus, it was important to formulate appropriate research questions to narrow down the scope of the research into a manageable and bite size problem. The purpose for developing research questions was to: organise the project and give it direction and coherence; delimit the project, show its boundaries; keep the researcher focussed; provide a framework when writing-up the research; point to the methods and the data that will be needed (Punch, 1998; p. 38). Thus, it was necessary to develop research questions that would help in pursuing the aforementioned objectives of the research. This focus had to be aligned with both the needs of the industrial and academic requirements. This was done through a regular review of the EngD scope (aim and objectives of the research) to reflect such needs as the project progressed.

3.6 Methods used for this research

3.6.1 Literature review

A literature review can be defined as ‘the selection of available documents (both published and unpublished) on the topic, which contain information, ideas, data and evidence written from a particular standpoint to fulfil certain aims or express certain views on the nature of the topic and how it is to be investigated, and the effective evaluation of these documents in relation to the research being proposed’ (Hart, 1998; p.13). The literature falling within the theme of the EngD research, skills and productivity, was extensive.

It spanned various disciplines, namely: econometric studies, Human Resource Management (HRM), labour market studies, and construction management. This was useful in providing different perspectives for pursuing the research, yet it provided a source for potential confusion. Nonetheless, the literature review was important at every stage of the research for informing and refining the research scope, in addition to keeping up-to-date with the most recently published studies. Indeed it could be regarded as the 'lifeblood' of the research.

This becomes relevant when considering that the relationship between skills and productivity has been a recurring theme in numerous government reports and policy documents in recent years and over the course of conducting this research, as alluded to in the previous Chapter. In pursuing the specific objectives of the research, mentioned above, it was important to formulate appropriate research questions where the literature review was essential in refining those questions. Keep and Mayhew (1999) argued that researchers need to invest a significantly greater time and effort in trying to 'name and frame' the research problem with the aim of developing a better class of question.

During the data collection and analysis stage, it was also essential to review the literature, as Silverman (2005; p.299) explained that the bulk of the reading is usually best done in and around the data collection and analysis, i.e. the reading should be done simultaneously whilst doing the analysis. For example, when considering objective 2, the literature review helped in identifying various profitability measures used in different studies, providing insights into which measures to adopt along with the appropriate justification. In effect, the literature review was important in order to fulfil all the research objectives throughout the whole EngD research.

3.6.2 Secondary data analysis

Secondary data refers to existing construction statistics published by the Office of National Statistics (ONS). A further discussion and description of the data used could be seen in the research method section in Paper 1: Appendix 1. Within the context of objective 1 of the EngD research, the rationale for adopting the analysis of secondary data was simply to examine the trends of skills and productivity in the construction industry over the past decade, as per the official statistics (objective 1 of the research). With reference to Dainty (2007) and the broad classification of construction management research, this analysis would fall into the category of ‘engineering orientation’ where the focus is on discovering something factual about the world it focuses on as opposed to a subjective approach where the objective is to understand how different realities are constituted.

Using official statistics was not without its problems and it presented two challenges, namely: definitional and measurement problems (See Abdel-Wahab *et al.*, 2005); in addition to conflicting resources. Skills indicators, available from official statistics, include the following: educational attainment, participation in training, and occupational levels, which is readily available from the Labour Force Survey (LFS) (Jaggar *et al.*, 2005). Productivity-related measures however were more problematic due to: inconsistencies, discrepancies, and discontinuities in the data. Thus, it was necessary to review various statistical sources in order to ascertain the most reliable productivity measure/source (Abdel-Wahab *et al.*, 2006).

The review of the data was important to ensure having the most reliable data, in light of available data, before examining the trends of skills and productivity as per objective 1 of the research. Clearly, the quality of data used in the research is of paramount importance if the results are to be deemed reliable otherwise ‘Garbage-In Garbage-out’ (GIGO).

3.6.3 Combining data from existing sources

Similar to the review of officially published statistics, it was necessary to review the wealth of company-related data available internally at CITB-CS. The guiding principle was to investigate the possibility of merging CITB-CS company-related data with financial performance data available from the FAME⁵ database. Nine different company-related (available from CITB-CS), i.e. data available by-name and postcode of company, datasets were identified, which can be seen in Table 3 below. In order to make the research more manageable it was sensible to focus on levy/grant data in relation to the FAME database, hence this was the focus of objective 2 of the EngD research.

The grant/levy data was specifically selected because CITB-CS retains its statutory right as ITB for imposing a levy on construction companies and re-distributing it in the form of training grants. Thus, it was of strategic importance to CITB-CS to explore the effect of training grants on companies’ financial performance. In essence, this can potentially demonstrate the value added from the training grants scheme. The FAME and levy/grant register data were successfully combined into one unique dataset. Using strict matching criteria, based on a full name and postcode match, there were 1,057 company matches between both data sources.

⁵ FAME is a database entitled ‘Financial Accounts Made Easy’ – which contains detailed financial information of construction companies.

There were two key factors which affected the number of company matches: first, non-conformance of company names to a common name standard in both data sources and second, around a third of the companies on the grant/levy register were sole proprietors, where the FAME database does not include any financial information on sole proprietors.

It has to be noted that this research method would not have been possible if the research was not conducted in an industrial context because the data would simply not have been accessible. This dataset enabled producing information on companies' training grants and levy payments in relation to their financial performance. Moreover, this dataset is envisioned to be a valuable and rich resource for future research that extends beyond the scope of this EngD research.

Table 3: List of company-related datasets⁶

Dataset	Populated variable list
1. FAME	<ul style="list-style-type: none"> - Primary UK SIC (2003) Code - Number of Employees - Turnover - Value Added - Gross Profit - Operating Profit - Profit (Loss) after Tax - Profit (Loss) for Period - Retained Profit(Loss) - Remuneration - Profit Margin (%) - Return on Capital Employed (%) - Return on Total Assets (%) - Salaries/Turnover (%) - Average Remuneration per Employee - Gross Margin (%)
2. LEVY/GRANT register	<ul style="list-style-type: none"> - Size of employer - Main activity description - Assessed levy - Grant value - Federation membership
3. National Construction College (NCC) customers	<ul style="list-style-type: none"> - Number of trainees - Course name - Duration of course - Course price
4. Employer Satisfaction Survey (<i>qualitative data</i>)	<ul style="list-style-type: none"> - Grant spent by-type of training - Effect of grant on training activity - Role of CITB as a statutory body for encouraging training - Value of the grant/levy system
5. Managing agency data	<ul style="list-style-type: none"> - Employers taking an apprentice - Type of training - Reason for an apprentice leaving
6. INSPIRE scholarships	<ul style="list-style-type: none"> - Number of students sponsored - Type of course - CITB region
7. On-site Assessment and Training (OSAT)	<ul style="list-style-type: none"> - Number of candidates going through the OSAT route and level of qualification pursued.
8. Investors in people (IiP)	<ul style="list-style-type: none"> - Number of companies achieving IiP standards.
9. Management and leadership data	<ul style="list-style-type: none"> - Management skills identified for companies to be more productive
10. Publications data	<ul style="list-style-type: none"> - Companies buying CITB publications

⁶ The datasets highlighted are the ones used in the scope of the EngD research.

3.6.4 Telephone survey

A telephone survey is defined as a research method for collecting information by interviewing people over the telephone. An advantage of using telephone surveys is that interviewers can elicit more complete and substantive answers from respondents as well as allow for clarification and elaboration concerning responses. This is essential in order to ensure having consistency in the results of the survey. A telephone survey also helps in achieving a hundred percent response rate as opposed to traditional mail or online questionnaires.

This method was used in pursuing objective 3 of the research. The questions designed for addressing objective 3 were integrated with a major telephone survey, Employer Panel Consultation (EPC), undertaken by the EngD industrial sponsor. The EPC surveys over 1,500 employers across the UK, which takes place every 6-months, providing an open and regular programme of employer consultation on topical issues in the construction industry, such as: skills shortages, migration, and Health and Safety. The EPC was first started in 2004 and due to finish by 2009.

The sample of companies was drawn from the ConstructionSkills grant and levy register, which covers companies falling within the definition of the Standard Industrial Classification of the construction industry (SIC45). The data was weighted to reflect the regional distribution of the SME population as per the Annual Business Inquiry (ABI) survey – which is published by the Office of National Statistics (ONS). Thus, the sample represented a stratified sample from across the UK.

A main advantage of using the EPC is that it enabled reaching out to a much bigger number of employers – which would not have been possible if the research was not carried out within a relatively big research and development department at the sponsoring company.

3.6.5 Research synthesis

Research synthesis is the process through which two or more research studies are assessed with the objective of summarizing the evidence relating to a particular question (Gülmezoglu, 2003). Given the use of the aforementioned methods for undertaking the EngD research objectives, synthesis of the research findings was essential in addressing objective 4 of the research, in addition to aiding in putting together this dissertation. Gülmezoglu (2003) argued that research synthesis is particularly important for policymakers given that the volume of research is overwhelming and the variability of the quality of research studies available. In summary, the research synthesis is an attempt to provide a storyline for the research undertaken and present findings in a succinct manner. It was important however to drawn upon the literature selectively and appropriately as needed in the telling of the story of the research (Wolcott, 1997; p.17).

3.7 Research objectives and methods

Table 4 below provides a summary of the research objectives in relation to the adopted research methods and tasks along with the final output of each objective in terms of published papers. As discussed above, it is important to emphasise the industrial context of conducting the EngD research in order to have a complete understanding of the rationale behind the methods adopted within the scope of this research. The next Chapter discusses in detail the research tasks undertaken in light of each research objective.

Table 4: Research map

Research aim				
<i>To examine the relationship between skills development and productivity in the construction industry in order to inform future skills policy.</i>				
	Objective 1	Objective 2	Objective 3	Objective 4
	Examine the trend of skills and productivity of the construction industry.	Explore the relationship between training grants and profitability of UK construction companies.	Survey companies' participation in skills and training initiatives.	Provide recommendations for skills policy.
Research Method	<i>Literature Review (3.6.1)</i>			
	<i>Secondary data analysis (3.6.2)</i>	<i>Combining data from existing sources (3.6.3)</i>	<i>Telephone survey (3.6.4)</i>	<i>Research synthesis (3.6.5)</i>
Dataset	LFS	<i>FAME/Training grant data</i>	<i>Data gathered from telephone survey</i>	-
Research Tasks	<ul style="list-style-type: none"> Defining the construction industry. Review measures and definition of skills. Review measures and definition of productivity. Analysis of trend of skills and productivity. 	<ul style="list-style-type: none"> Gather and analyse FAME and grant data. Review financial (profitability) measures. Review HRM and 'evaluation of training' literature. 	<ul style="list-style-type: none"> Identify and define skills and training schemes. Questionnaire design and piloting. 	<ul style="list-style-type: none"> Synthesis of research findings. <p style="text-align: center;">⋮</p>
Outputs	Papers 1 and 2 <i>ARCOM & ECAM</i>	Paper 3 IJTD	Paper 4 CIQ	

Chapter 4: Research undertaken and key findings

4.1 Introduction

This Chapter discusses the research undertaken in order to meet the aim and objectives of the EngD research. Issues pertinent to the realisation of each objective are specifically outlined. Each research objective was pursued in accordance with the methods discussed in the previous Chapter. Reference is made to the appended papers, which should be read in conjunction with this Chapter.

4.2 Trend of skills and productivity in the construction industry (*objective 1*)

Skills development and training are emphasised in government skills policy as a vehicle for attaining productivity improvements across all sectors of the economy – as discussed in Chapter 2. Thus, objective 1 - examining the trends of skills and productivity in the UK construction industry - was the starting point of the research. The idea was simply to investigate whether or not the trends in construction statistics are consistent with the government skills policy claims. This investigation was not straightforward due to the problems inherent in the data as alluded to in the previous Chapter, but it was a necessary step if the EngD research was to capitalise on the wealth of construction statistics which is seldom used in construction management research. A pre-requisite to pursuing this objective was to address the following issues: definitional and measurement problems, in addition to understanding and reviewing the existing statistical sources.

4.2.1 Defining the construction industry

A first challenge when researching the construction industry is the complexity of defining the sector. Ive and Gruneberg (2000) defined construction as all production activities contributing to the production of the built environment. This definition is not only confined to construction activities on-site, but also it includes other activities essential for executing a construction project, such as the design of the building, and the supply of materials through quarrying activities. It is probably better to regard construction as a loose agglomeration of agents and activities, which can be unpackaged and packaged in different ways, rather than a discreet industrial sector (ILO, 2006). It follows that the scope of the industry is enormous and this would potentially complicate any studying of the industry performance and operations.

However, the distinction between a 'narrow' as opposed to a 'broad' definition for construction activities provides a useful starting point (Pearce, 2003). The former relates to activities on-site, whereas as the latter encompasses all other activities which do not take place on-site. Clearly, it is a challenge to capture the entire scale of all construction activities; nonetheless the official statistics provide a useful and perhaps the only available source, though it is indicative, for studying the construction industry as a whole. The construction industry activities, as per official statistics, can be defined by: the type of outputs produced by construction firms; and type and value of projects undertaken - which are subsequently discussed.

The output produced by construction firms could be defined through the Standard Industrial Classification (SIC), which classifies business establishments and other statistical units by the type of economic activity in which they are engaged. The classification provides a framework for the collection, tabulation, presentation and analysis of data and its use promotes uniformity. In addition, it can be used for administrative purposes and by non-government bodies as a convenient way of classifying industrial activities into a common structure (ONS, 2006).

The official SIC definition for construction however is not particularly useful when attempting to understand how the industry actually operates, for example, it ignores the difference between house building and other forms of construction (Morton, 2002). This brings in the importance of the Annual Construction Statistics, published by BERR (Department for Business, Enterprise and Regulatory Reform), which provides information on the type and value of projects undertaken. BERR classifies the types of construction projects into the following categories or sub-sectors: Repair and Maintenance (R&M), Housing, Infrastructure, Commercial and Industrial – See Figure 2 above – Chapter 1.

The construction industry definition adopted, in relation to objective 1 of the research, was as per the SIC45 to ensure consistency with other SSCs when using various statistical sources (See Abdel-Wahab *et al.*, 2008 – for further details – Paper 3). It has to be noted that this narrow definition offers a useful starting point when attempting to study the overall skills profile and industry productivity over time. This should provide an indicative view of the history of the industry and its projected future.

4.2.2 Definition and measures of skills

Whilst there is an increased interest in how skills in Britain have changed over time, how they are distributed, and how these trends and patterns compare with competing nations, there is surprisingly little agreement on what ‘skills’ actually refer to” (Felstead *et al.*, 2002). For example, this is evident when considering the report of the Skills Task Force Report (2000), where the definition and data presented do not provide a coherent meaning of skills. First, the report defines three types of skills: generic – transferable employability skills used across a large number of different occupations; vocational skills – occupational or technical skills needed to work within an occupation or occupational group; personal attributes – the characteristics employers say they most often look for in an applicant when recruiting (e.g. motivation, judgement and leadership). Then, the data presented considers the change in occupational levels arguing that the emphasis has moved from manual to non-manual occupations – which is used as a proxy for skill levels. Another proxy is the qualification level (usually levels 2 and 3) where the UK is traditionally deficient at level 2 skills. Historically, the term ‘skill’ was used to refer to the manual craft worker and technologist (Ainely, 1994; Keep and Mayhew, 1999). According to the Further Education Unit (1982), “the skill concept was widening to include ‘the ability to perform a specific manipulative occupational task’ and which now embraces: Language (reading, writing, speaking and listening); number (calculation, measurement, graphs and tables); manipulative dexterity and co-ordination; problem solving; everyday coping, interpersonal relationships; computer literacy and learning”.

Payne (2000) contended that skills cover everything from reading, writing reliability, communication, reasoning, problem solving and motivation to assertiveness, judgement, leadership, team working, customer orientation, self-management and continuous learning. Despite the confusion and multiplicity surrounding the definition of skills, the official statistics offer a starting point for the overall state of skills within the construction industry. Skills indicators commonly used include qualification levels (NVQs) and participation levels in training as per the LFS (See Leitch Review, 2006; DfES, 2003; DfES, 2005). Thus, the rationale for adopting these skills-indicators was to consider the government skills policy assumptions, using the same metrics, within the context of the construction industry. Steedman (1999) argued that qualification levels are a respectable proxy for skills within the context of developed economies. Other types of skills include leadership and management which are relevant to the enhancement of productivity performance. For a further discussion of the definition of skills see (Abdel-Wahab et al., 2005).

In this context, it is important to note that qualification levels are not only limited to NVQ levels, but also it encompasses other qualifications. As such, there is a National Qualification Framework (NQF) which maps out the available qualifications onto different qualification levels. According to the NQF, there are nine current levels of qualification, which comprises the following: Entry level (Entry level certificates in adult literacy); Level 1 (such as NVQ level 1, GCSEs Grades D-G); Level 2 (such as NVQ level 2, GCSEs Grades A*-C); Level 3 (such as NVQ level 3, A levels); Level 4 (such as NVQ level 4, certificates of higher education); Level 5 (such as NVQ level 5, diploma of higher education or foundation degrees); Level 6 (such as Bachelor degrees); Level 7 (such as Master degrees) and Level 8 (such as Doctorates) (QCA, 2008).

4.2.3 Definition and measures of productivity

A common definition of productivity is output per unit input (Horner and Duff, 2001; Oglesby, 1989; Quambar, 1999). However, it is more accurate to describe it as a relationship between output and input which varies in terms of the context and objectives behind measurement (Flanagan *et al.*, 2003). For example, measuring productivity at the operational level will require different sets of input and output as opposed to the firm, project and industry levels. Olomolaiye *et al.* (1998) considered productivity to be conceptually different than a simple output/input ratio, which should further include the capacity to produce and the effectiveness of the production process. This means that productivity, generally, is an indicator of effective utilisation of inputs to produce maximum output, at the same time, higher productivity levels could be a result of having more inputs, which are not necessarily being used effectively. Indeed, wasteful utilisation of resources could actually be a symptom of poor performance. For a more detailed discussion of the complex nature of defining productivity see (Abdel-Wahab *et al.*, 2005).

According to Smith (1990), the productivity of a company is regarded as the resultant of all personal and organisational efforts associated with the production, use, and/or delivery of products and services. She identified five views of productivity measurement, which encompasses the following: Accounting, Economics, Engineering, Industrial/Organisational (I/O) approach and management. The Table below shows examples of ratio measurement in light of these views:

Table 5: Productivity measures

Measurement view	Description	Example of ratios/ indicators
Accounting	Using financial ratio analysis	Profit/Employee, Sales/Fixed assets
Economics	Relating to the production distribution, and use of income, wealth and commodities, which encompasses macro and micro perspectives.	Value added/worker or hour, Gross output/worker (or hour)
Engineering	Operational measures at the plant level during the production process.	Results achieved/resources consumed, Useful work/energy
Industrial/Organisational (I/O) approach	I/O deals with employee and organisational 'health', such as quality of work life, organisational efficiency and effectiveness	Completed jobs/jobs attempted, Worker output/labour hours input
Management	Setting out management standards for achieving business goals and objectives	Management output/Management cost, Individual accomplishment/Work group accomplishment.

It appears from the existing literature that there are a wide variety of meanings and connotations of the term 'productivity' which renders any attempt to estimate productivity performance as potentially confusing. Thus, a process was adopted in this research in order to come-up with an appropriate and reliable productivity estimate – see Figure 4 below. Identifying a measurement view, as per Table 6 above, was a necessary first step. Then, variables identification, definition and selection were important steps in narrowing down the scope of measurement within the context of the research undertaken.

Gathering data in light of the defined variables is the next challenge particularly to ensure the completeness and consistency of data available. Necessary preparation of the data is often required, which may include adjusting for inflation if monetary figures were used or cleaning the data by eliminating outliers which may skew the data.

Now the data is ready, step 4, for estimating productivity performance and the appropriate data analysis techniques could be employed, such as trend analysis; paired t-tests or independent t-tests, in order to report the results of productivity analysis. This process is guided by the context in which this productivity measurement/estimation takes place.

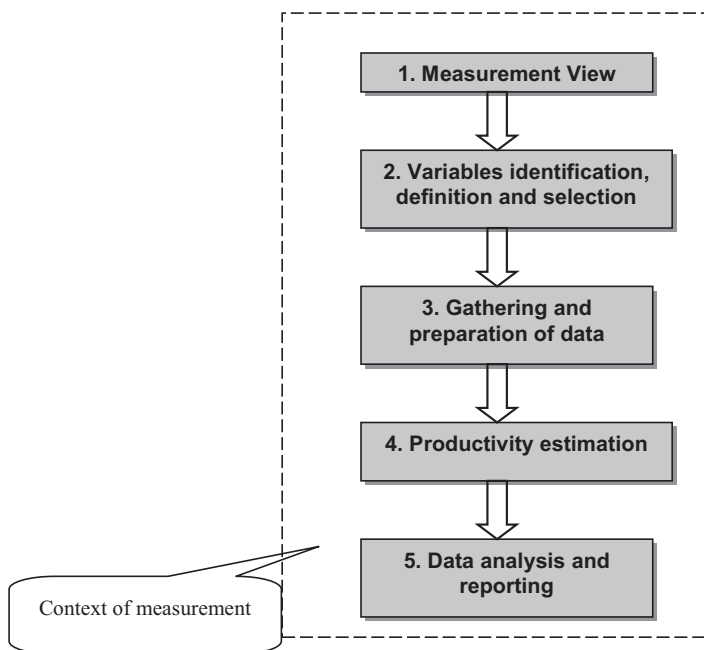


Figure 4: Productivity analysis process

In order to assess the productivity performance of the overall construction industry, inline with objective one of the research, the economic view of productivity (which is highlighted in Table 5 above) was adopted. This becomes also important when considering that the construction industry is a significant contributor to an economy - 6-8% of GDP (Arditi and Mochtar, 2000). As such, the productivity analysis process was guided by both the context (economy or firm or individual) and purpose of measurement.

4.2.4 Key findings

Identifying the definitional and measurement problems, in addition to the review of available construction statistics, were pre-requisites to the analysis of the trend of skills and productivity. This was an important starting point in order to understand what the existing statistics are showing in relation to the association of skills and productivity, which is of great importance to the CITB-CS when considering its SSC remit. It was found that Gross Value Added (GVA) per worker was deemed as the most appropriate measure of productivity as opposed to the Construction Excellence (CE) measure (See Appendix 1: Paper 1). The proxies used for skills were qualification levels attained in addition to participation levels in training.

The trend of skills (measured by qualification attainment and participation rates in training) and productivity (measured by GVA/per worker) over the period of 1995-2006 revealed that there was inconsistency in the industry's productivity performance, despite the overall increase in qualification attainment levels and participation rates in training over the same period (Appendix 2: Paper 2).

However, the change in the participation rate of training was not consistently associated with an improvement in productivity performance. This evidence suggests that a mere boost of qualification and training levels in construction does not render itself to improvements in productivity performance. It is argued that effective utilisation of skills rather than a mere increase in the supply of skills is key to bringing about productivity improvements.

This finding has crucial implications to government skills policy blanket targets which hinge on increasing qualification attainment levels as well as increasing participation levels in training - through setting national targets – as will be discussed later in this Chapter.

Whilst the overall trend of skills and productivity was useful in understanding how the industry has changed over a 12-year period, it was not sufficient for having an in-depth understanding of the relationship between skills and productivity notwithstanding the definitional and measurement difficulties. There is also evidence which suggests that the amount of training in Britain, defined as the duration of training multiplied by the number of workers participating in training, reported in the LFS has remained the same (see Felstead *et al.*, 1997). This implies that whilst the incidence of training (captured in the LFS) has increased, the time spent on training has decreased. The LFS data only provides information on the incidence of training activity as opposed to the type or quality of training undertaken.

As such, this necessitates a firm level enquiry since Albriksen and Førsund (1990) explained, a micro-level analysis of the construction industry is essential to provide an explanation of lower productivity levels at the macro-level. Indeed such a level of analysis should shed light on companies' practices in terms of their skills development and training activities in relation to their productivity performance. As such, the unit of analysis adopted in the remainder of this EngD research was at the company-level.

4.3 Training grants and profitability of construction companies *(Objective 2)*

The CITB and ECITB are the only two ITBs which retained their levy statutory powers amidst the abolishing of all other ITBs back in the 1980s. This was mainly attributed to the overwhelming support of employers in those sectors. Recent survey evidence showed that nearly three quarters of companies on the levy/grant register, which has around 60-70,000 companies, support the continuation of a statutory levy/grant system for training in the UK construction industry (ConstructionSkills, 2006). The continuation of a statutory levy order in the construction industry is dependent on the endorsement of employers. The money raised through the levy is redistributed in the form of training grants to construction companies, which covers the following areas of training: New Entrants Training (NET) - such as apprenticeships; adult craft – which includes training activities for adult workers; plant operative training; management training – such as Site Management and Safety Training Scheme (SMSTS); qualifying existing workforce to provide a formal recognition of their skills through schemes, such as On-Site Assessment and Training (OSAT); and developing a company training plan. Clearly, the grant scheme encompasses a wide array of training activities in an attempt to meet the diverse needs of such a complex industry as construction.

Given the remit of CITB as a SSC, and hence the name CITB-CS, its aim goes beyond merely increasing the incidence of training in the construction industry, but helping companies to use training as a vehicle for attaining potential productivity gains, as discussed above.

Despite the theoretical and intuitive appeal of investing in training and skills development, as always cited in government policy documents and reports, there remains a paucity of company-level data on investment training in relation to profitability (Appendix 4: Paper 4). It follows that there is a need to demonstrate that ‘training grants’ provide a useful and valuable resource for assisting the business activities of construction companies.

Thus, the aim of this part of the research was to explore the relationship between construction companies’ ‘training grants’ and profitability. The idea was to collect prima facie evidence of how the two variables could be related. As mentioned in the previous Chapter, the research method employed was based on combining data from existing sources. The idea was to make use of the wealth of company-related data available internally at CITB-CS before attempting to collect yet new survey-type data from employers.

4.3.1 Gathering and analysing of FAME and grant data

The gathering and analysis of data from FAME and CITB-CS sources was a crucial activity if the aforementioned objective of the research was to be fulfilled. Thus, the activities in relation to gathering and analysing data were carefully planned using a Gantt chart – which is shown in Figure 5 below. It has to be noted that these activities and milestones were only indicative and were used in order to manage the progress of the project. As an aid for undertaking each project activity, an activity breakdown structure was developed as shown in Exhibit 2 below. This simply highlights the various activities undertaken over the course of pursuing this research objective, though not strictly in chronological order but rather in a post hoc fashion. The key milestones of the project were: establishing a measurement framework (in other words reviewing various measures of training and profitability); Combining the two datasets; analysis of the data (using descriptive and inferential statistics in SPSS), and finally reporting the results. It has to be noted that reporting of the results was done through the writing-up of the research paper for the IJTD (Appendix 4: Paper 4). This was an extremely useful process (though challenging) because it summarised the key findings of this research whilst demonstrating the new contribution of this research to the existing literature.

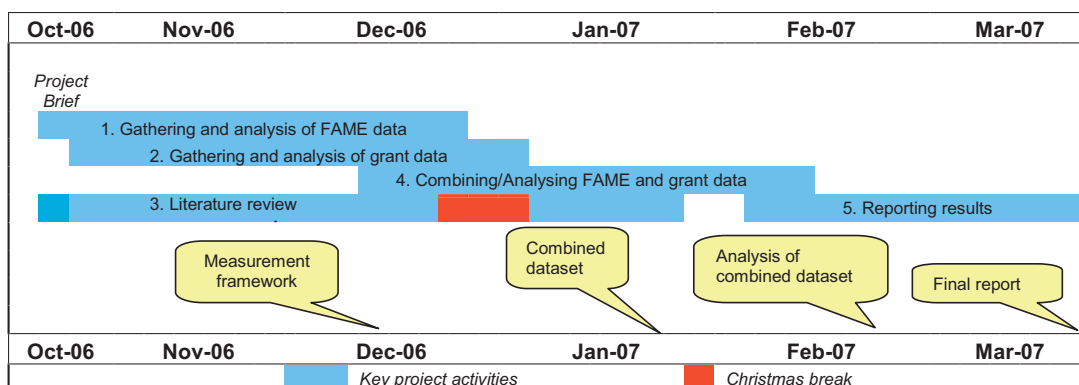


Figure 5: Gantt/milestones chart

- 1) **Gathering and analysis of FAME dataset**
 - a. Studying the data.
 - b. Identifying relevant variables.
 - c. Analysing data statistically in FAME.
 - d. Reporting on company performance
- 2) **Gathering and analysis of grant data**
 - a. Obtaining data from relevant sources
 - b. Studying data
 - c. Identifying compatibility issues
- 3) **Literature review – which covered the following areas:**
 - a. Measuring productivity using financial performance data
 - b. Limitations of financial data measures
 - c. HRM and performance
 - d. Evaluation of training
- 4) **Combining of FAME and grant data**
 - a. Checking consistency of combined dataset
 - b. Modifying datasets where necessary
 - c. Conducting descriptive and relevant statistical analysis
- 5) **Reporting results** – producing reports with findings and writing-up
Journal paper 2 – IJTD.

Exhibit 2: Activity breakdown structure

4.3.2 Review of financial (profitability) measures

Whilst gathering and analysing data was the key task for pursuing objective 2 of the EngD research, the literature review had to run in parallel in order to inform the analysis. This was consistent with the view advocated by Silverman (2005) that the appropriate literature should be brought in over the course of data analysis and not treated as a separate Chapter.

In that respect, it was necessary to review various financial measures in order to inform the variable selection from the FAME database, which contained over 120 variables. It has to be noted that the same problem was not encountered with the levy/grant database because the number of variables were more manageable. With reference to Table 5 above, the measurement view of productivity adopted within the context of this part of the research was the accounting view. Then, the process described in Figure 4 above was followed.

Profitability measures constitute the ‘raison d’être’ of most companies and it is a metric that is familiar to employers which they can relate to, unlike the common use of productivity (in economic terms) in government skills policy documents which is elusive to employers (Keep *et al.*, 2006). Neely (2002) described the so-called “pyramid of ratios” as the most powerful tool for reporting on financial measures. The apex of the pyramid of ratios, which signifies the importance of this measure, is an overall measure of profitability that divides profit by the assets used in generating that profit, namely Return on Capital Employed (ROCE). However, Bryan and Joyce (2007) described the sole focus of financial measures on ROCE as an old-fashioned way of assessing companies’ financial performance, and called for the use of Profit Per Employee (PPE) as a good proxy for earnings on intangibles, such as training and research and development and argued that ROCE should only be used as a ‘Sanity’ check. Based on that rationale, PPE and ROCE were used in combination as key financial measures.

4.3.3 HRM and ‘evaluation of training’ literature

This review was necessary to both inform the scope of this study (training grants and profitability of construction companies) and to ascertain the contribution of this objective to the literature. In terms of the HRM literature, Figure 6 below -adapted from Paauwe and Richardson (1997)- provides a summary of the empirical studies that attempted to look at HRM practices, including training and development, in relation to performance. It also provides evidence that the objective 2 of the research fits with the existing synthesis of empirical research, providing a genuine contribution to knowledge given that it explores the relationship between employee training and development (through training grants) and firms profitability within the context of the construction industry.

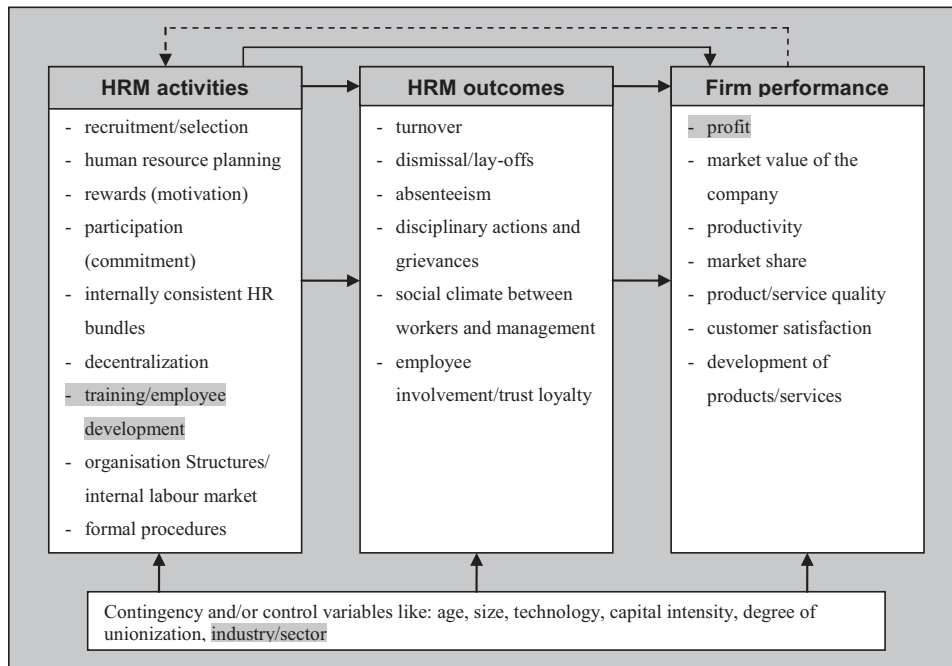


Figure 6: HRM and performance - a synthesis of empirically based research

Source: Adapted from (Paauwe and Richardson, 1997)

This is highlighted in Figure 6, but it has to be noted that the scope of this objective of the EngD focused on the link between HRM activities (training/employee development) in relation to firm performance, as indicated by the solid arrow, without looking at the HRM outcomes. See section 1.3.4 for a full justification for having this scope for the EngD. Furthermore, the review of the HRM enabled the identification of some of the shortcomings or the limitations of the existing literature (See Appendix 4: Paper 4). This was essential in order to identify the gap in the existing literature, particularly with regards to the methodological shortcomings of the existing training and performance studies. Indeed the advancing of the understanding of the relationship between HRM and performance is plagued with methodological difficulties.

The following issues were thus identified and addressed within the context of this EngD objective: time-lag effect of training; control groups (companies which claimed training grants as opposed to those who did not claim); and minimising the effect of reverse causality through using longitudinal dataset as opposed to the predominant use of cross sectional data in the literature.

In order to evaluate training in a structured way, Kirkpatrick's (1996) framework for the evaluation of the impact of training, which is widely used in the literature, offers a useful starting point. The framework includes the following four-levels: 1) Reaction- how the trainees reacted to the training (their feelings about the structure and content of the training and the methods employed); 2) Learning - the principles, facts and techniques learned by the trainees; 3) Behaviour - the changes in job behaviour and performance resulting from the training or how learning at the previous level has been applied by students; 4) Results – this is a measure of the final results that occur due to training, such as, increased sales, higher productivity, higher profits and less employee turnover. Phillips and Phillips (2001) extended Kirkpatrick's framework to include a fifth level that addresses the ROI (return-on-investment) of training and they noted that not all training activities or programmes require evaluation at all five levels. They explained that it is essential to identify the purpose of the training programme in order to inform the level at which the evaluation of training should take place.

This framework is useful in informing the level of evaluation at which ‘training grants’ should be undertaken. When considering the remit of CITB-CS as a Sector Skills Council (SSC), which involves encouraging skills development (through training) in order to help in improving companies’ productivity performance, the evaluation of ‘training grants’ at level four of Kirkpatrick’s model becomes apparent. An evaluation at this level would potentially help in demonstrating the added value of training grants in relation to enhancing productivity levels.

This is of vital importance to CITB-CS if it is to strengthen the evidence base underlying the existence of the levy/grant system in the construction industry. Not only paying back the levy money to the industry in the form of a training grant, but also ensuring that these training grants are targeted and focused to bring about potential productivity gains.

4.3.4 Key findings

It was found that there was no consistent and definitive pattern in the data in relation to training grants and company’s profitability. The research revealed that mere investment in skills development, through training grants, does not warrant profitability gains. Nonetheless, large companies appeared to claim more training grants in relation to the following areas of training: qualifying their existing workforce; developing training plans and management. Arguably, this is a reflection of company’s priority/commitment to specific areas of training amongst more profitable construction companies.

The findings suggest that large companies with higher profitability tend to consider having a structured approach to training activities through having a training plan as opposed to smaller-medium size companies who tend to have a more reactive or ad hoc approach to their training and development needs. Moreover, training grants provide a useful resource for UK construction companies and there is a need to ensure that training grants are focused or targeted to specific areas of training in order to realise potential profitability gains. Reference should be made to Appendix 4: Paper 4 for detailed findings.

4.4 SMEs participation in skills and training initiatives *(Objective 3)*

CITB-CS supports a plethora of skills and training initiatives in the construction industry that are aimed at encouraging companies to participate in training activities. Given its remit as a SSC, as discussed above, there is a need to survey companies' participation in skills and training initiatives in order to establish how far the drive for improving performance is an influencing factor upon the decision to participate in those initiatives. The main tasks undertaken for pursuing this objective were to: identify and define skills and training schemes and questionnaire design.

4.4.1 Identify and define skills and training initiatives

CITB-CS classifies skills and training initiatives according to the following categories: Net Entrants Training (NET); Qualifying the existing workforce and management training. This objective was focused on the initiatives supported by CITB-CS given the industrial context of the EngD research. The Table below summarises those initiatives (See Appendix 5: Paper 5):

Table 6: Classification of skills/training initiatives (source: *ConstructionSkills 2005*)

Scope of skills and training initiatives	Initiative
1. New Entrants Training (NET)	<ul style="list-style-type: none"> • Traditional apprenticeships; • Programme-Led Apprenticeships (PLAs); • INSPIRE scholarships.
2. Qualifying the existing workforce	<ul style="list-style-type: none"> • Construction Skills Certification Scheme (CSCS); • On-Site Assessment and Training (OSAT); • Experienced Worker Practical Assessment (EWPA).
3. Management	<ul style="list-style-type: none"> • Site Management Safety Training Scheme (SMSTS).

The aforementioned initiatives could be regarded as the products or service offerings of CITB-CS and undertaking this research was envisioned to be a potentially useful source of information to various departments across the organisation, such as Marketing and Communication Department.

Given that the research exclusively focused on SMEs, which represent the majority of employment in the construction sector, this presented a good opportunity for understanding the needs of a traditionally under-researched group of companies in the industry. More specifically, this should support the implementation of the Sector Skills Agreement (SSA) – see Table 2 above; as well as informing CITB-CS performance targets set out in its corporate scorecard – See Appendix 8.

For example, according to the ConstructionSkills scorecard (2006), NVQ/SVQ achievements through OSAT and EWPA were 32,284 as opposed to the 35,000 target. So, it is important that the targets are well informed and guided by employers' demand – which is at the heart of CITB-CS remit as SSC, i.e. proactively engaging with employers.

4.4.2 Questionnaire design

The questions designed, for pursuing this EngD research objective, were integrated with a major telephone survey undertaken by the research and development department at CITB-CS - namely Employer Panel Consultation (EPC). EPC presented a good opportunity because it provided access to approximately 1,200 SMEs in the construction industry. EPC is aimed at providing employers' perspectives on topical issues in the industry, such as migration and skills, in addition to establishing their attitudes and motivation towards learning and training. The EPC questionnaire was comprised of the following sections: recruitment and retention; grants from CITB-CS; training and qualifications; grant scheme vision; CITB-CS skills and training initiatives; non-UK workers. The questions designed for the scope of the EngD research were developed in a separate section, namely skills and training initiatives.

The overriding aim was to understand the underlying drivers for SMEs participation in various skills and training initiatives, which could then help in stimulating further demand for shortage areas that can potentially affect the industry's skills requirements (particularly NET schemes). From a CITB-CS perspective, this provides a useful source of information in order to better engage with employers in addressing their skills needs. The questions (see Appendix 7) were piloted and reviewed before the questionnaire was rolled out to companies via the telephone survey.

4.4.3 Key findings

It was found that ‘Qualifying the existing workforce’ initiatives appeared as the most popular amongst SMEs as opposed to ‘New Entrant Training’ (NET) or ‘management’ initiatives. However, SMEs regarded NET as an area of high priority in the future given the current workload pressures in the industry. The main reasons for SMEs participation in skills and training initiatives were seen as the need to comply with client and/or contract requirements in addition to addressing skills shortages, whereas the need for enhancing productivity did not featured as strongly. This evidence indicates that the aim of ‘improving productivity’ is of secondary importance to SMEs when it comes to their participation in the existing skills and training initiatives. For a further discussion on the drivers for training see (Appendix 5: Paper 5).

Chapter 5: Conclusions

5.1 Introduction

This Chapter summarises the EngD research findings along with its implications for: industrial sponsor, construction industry and skills policy. Conclusions are drawn from the research, in addition to highlighting the limitations along with recommendations for future research.

5.2 Summary of research findings

The overarching aim of the EngD research was to examine the relationship between skills development and productivity in the construction industry in order to inform future skills policy. The research was conducted as per Table 4 above – see Chapter 3. The Table below summarises the key research findings, which are mapped against the papers published.

Table 7: Summary of research findings and outputs

Research objective	Key finding	Output				
		P1	P2	P3	P4	Thesis
1. Examine the trend of skills and productivity of the construction industry.	Whilst there was an overall increase in skill levels (measured by qualification attainment levels and participation rates in training) over the past decade, the productivity performance of the construction industry has not shown noticeable improvements.	✓	✓	✓		✓
2. Explore the relationship between training grants and profitability of construction companies.	There was no linear relationship between training grants and profitability. However, large and more profitable companies appeared to claim more training grants in relation to the following areas of training: management, qualifying their existing workforce (certifying the skills of their existing workforce) and developing training plans.				✓	✓
3. Survey companies' participation in skills and training initiatives.	SMEs participation in skills and training initiatives was focused more on qualifying their existing workforce (i.e. the formal recognition/certification of existing operative skills) rather than on taking on new entrants or enhancing management competence.					✓
4. Provide implication for skills policy.	The complex nature of the relationship between skills development and productivity should be more acknowledged in government skills policy debates. However, training activities should be <i>specifically</i> targeted and focused towards productivity performance.				✓	✓
P1: How productive is the construction industry? <i>ARCOM'06</i> . P2: Trends of skills and productivity in the UK construction industry, ECAM'08 . P3: An exploration of the relationship between training grants and profitability of UK construction companies, IJTD'08 . P4: The participation of SMEs in skills and training initiatives in the UK construction industry: implications for skills policy, CIQ'08						

5.3 Contribution to knowledge and practice

The research conducted over the course of the EngD makes a contribution to knowledge which is evident by the research being peer reviewed and published in national and international academic journals. The evaluation of training in this thesis (objective two of the research), measured by training grants, was informed by Kirkpatrick's (1996) framework for the evaluation of training – which was discussed in Chapter 4. Within the context of the EngD research, evaluation of training grants was essential at level four of the Kirkpatrick's framework. This becomes justified when considering the role of CITB-CS as SSC, which is focused on enhancing the skills of the construction workforce in order to bring about potential improvements in productivity performance in the construction industry. An evaluation at this level would potentially help in demonstrating the added value of training grants. Attaining potential improvements in productivity, as a result of training grants, would enhance the evidence base underlying the existence of a levy/grant scheme in the construction industry. This is of strategic importance to CITB-CS because it will provide an additional justification for the continuation of the levy/grant system in the construction sector.

The creation of this new and unique dataset means that, in addition to it being exploited for future research as will be discussed later, it can be annually updated in order to assess the profitability of construction companies in relation to the amount and type of training grants they have claimed. Arguably, this could be useful in addressing the shortcoming of research, commissioned by the UK government, which uses a productivity metrics which senior managers are unfamiliar with as it does not relate to their business context (Keep *et al.*, 2006). Indeed profitability measures are more akin to a business environment. At the same time, it could provide up to date prima facie evidence on how training grants and profitability may be related.

5.4 Recommendations for the industrial sponsor

As there is no straight forward linear relationship between skills development and productivity, there is a need to ensure that this is clearly communicated within the context of government skills policy particularly in relation to the PSA targets. Moreover, Keep (2006) argued that one of the most important functions of SSCs is to keep reminding the government and its agencies of the complexity pertaining to tackling the skills and productivity issues in their respective sectors. As such, CITB-CS has to communicate this message clearly to government and its agencies.

5.4.1 Levy and grant scheme

CITB-CS retains a levy/grant scheme - which enjoys the support and backing of a majority of employers in the sector. Given its role as SSC, it can promote skills development through training grants as a plausible means of attaining productivity gains amongst construction companies. It has to be noted that this claim would only be applicable if the problem faced by a company, which inhibits its productivity performance (e.g. profitability), could be attributable to skills development, such as training. The next question becomes what is the nature or type of training activity, e.g. management training, which CITB-CS needs to promote in order to support productivity performance of construction companies? This is a problematic question to address when considering the complex structure of the construction industry, which is made-up of various sub-sectors with the majority of its workforce working in SMEs. Clearly, this translates into diverse and disparate training needs and accordingly it becomes challenging to prescribe one training activity for all companies to embrace. Nonetheless, CITB-CS can provide general guidelines for companies to pursue their training needs without resorting to being overly prescriptive.

This should include encouraging companies to be more proactive in addressing their future training needs. This would mean having a more structured approach for planning training through formalising it into a training plan. As such, this could help CITB-CS to encourage companies to claim more training grant as per its corporate performance scorecard targets (see appendix 8). In turn this might raise employer demand for training activities, which is consistent with the recommendation of the Leitch Review to SSCs.

Currently, there are grants allocated by CITB-CS that are aimed specifically at companies to develop a training plan, but the challenge is to ensure that such a plan is geared towards the development of the business and most importantly that it is implemented successfully. Whilst the CITB-CS role is to provide those training grants and promote training in general, it needs as a SSC to demonstrate that training has had an impact on companies' productivity performance. Developing a training plan (that is implemented successfully) is essentially the first step if a company is to show commitment to training. Then, other areas of training activity could emerge as a result of having this plan, such as, management training or qualifying their existing workforce, which could be regarded as a priority area for the business. Then, the question is which training activity would potentially yield productivity gains? This requires training activities to be targeted and focused, and more importantly aligned with the strategic objectives of the business. The findings of this EngD suggest that companies with higher profitability levels tend to claim training grants in the following areas: developing a training plan; qualifying their existing workforce and management training (See Appendix 4: Paper 4). It might be worthwhile to consider specific *'productivity-based'* training grants.

This would mean in practice that companies would have to identify what training activities they want to pursue and demonstrate the potential effect of this training on their profitability – if they are to be awarded these grants successfully. A good case in point is offered through the Employer Training Investment Programme (ETIP), which is administered by the Department of Commerce and Economic Opportunity (DCEO) Illinois in the USA.

ETIP is a new generation of employer-focused, customized training grants, which reimburse companies and organizations for up to 50% of the costs of training their employees. A more specific example is of a food manufacturing company, which claimed training grants through ETIP, that enabled it to invest in a new manufacturing software system, and the grant money was used to train three-quarters of its employees in a new software system (Blagojevich, 2004). The implementation of this new system will help in increasing the company's production by 75% which will bring greater profitability. Unless training grants are tied to specific training activities and being related specifically to a clearly defined productivity (profitability) performance outcome, any efforts to promote productivity-based training may be rendered wasteful.

The Grant Scheme Working Party⁷ (GSWP) at CITB-CS might consider this idea of 'productivity-based training grants' as explained above. A prerequisite to companies' application for this grant is to demonstrate the potential impact on its productivity performance whilst satisfying the requirement of having a training and development plan.

⁷ GSWP monitors the take-up of the grants scheme and reviews grant provision and maximises the Training Committee budget, considers and recommends to the Training Committee amendments to the Grants Scheme.

At the same time, post evaluation of training grants could be required where companies can assess and reflect on the actual contribution and the benefits of training grants to their companies' productivity performance, such as profitability. Not only will this demonstrate the actual value added of training grants, but also it would help in companies assessing the true benefits of training to their business. Ultimately, this may help in promoting training grants to other employers on the basis of productivity benefits and whereby building on the existing evidence base underlying the existence of the grant scheme in the construction industry.

5.4.2 CITB-CS skills and training initiatives

Given that CITB-CS supports a number of skills and training initiatives in the construction industry (see Table 6 above), there should be more focus on schemes that relates to attracting new entrants to the construction industry, apprenticeship schemes and PLAs – as demonstrated by the findings of this EngD (See Appendix 5: Paper 5) . This is already happening with the launch of a cross-industry apprenticeship taskforce as mentioned above. It has to be noted that schemes are only one way for companies to attain their training needs as a business, but these training schemes predominantly focus on the individual level as opposed to the company as a whole entity. This means that the existing schemes are less likely to bring about any potential productivity improvements. Having said that, the existing schemes are valuable in meeting other skills needs of the industry, for example CSCS helps in meeting the industry H&S standards. The answer is not to have new schemes because currently there is initiative overload in the construction industry and creating new initiatives or even following pan-industry initiatives (such as Train to Gain) and attaching funding to it is unlikely to coerce employers to participate in training activities.

The bottom-line is that companies should take the ownership of training within their companies and not the government. The idea is simple if the companies see the benefits of investment in skills development as immediate they will have their own drive to pursue such investment without the need for being persuaded by government policies or initiatives. Thus, what needs to happen is to promote training to companies and provide them with necessary support for training, such as through grants, as mentioned above, when they need it. The promotion of training amongst employers will only gain more credibility and be more effective if the evidence base underlying training and productivity is more compelling.

At the moment, research that constantly asks employers about their drivers to train, where productivity is cited discretely as one of the drivers, is unlikely to achieve that desired outcome. Thus, CITB-CS future research needs to be more targeted and focused on understanding the 'real' contribution of skills development (training) within the context of construction business. This could then act as exemplar for construction companies which might trigger other companies to rethink about their businesses training needs and perhaps start by developing a training and development plan if they do not have one. In summary, CITB-CS can do more in terms of promoting and facilitating of training activity within the construction industry, but the actual ownership of training rests within the construction organisation, more specifically the HR department if it had one or alternatively the board of directors.

5.5 Implication for skills policy

The findings presented in this thesis may provide implications for government skills policy within the context of the construction industry. The findings of this research demonstrated that the relationship between skills development and productivity is a complex one, nonetheless training activities needs to be targeted and focused to the specific business needs of companies if any potential effect on productivity performance is to be realised. A simple increase in qualification levels (including level 3) or participation rates of training is not sufficient to bring about productivity improvements in the construction sector. There is a need to view the change of qualification levels within the context of the construction sector in order to assess the true impact of attaining those qualifications. This would mean in practice assessing the productivity of workers in construction companies or on-construction projects, e.g. before and after they have obtained their qualification at level 3.

Until the evaluation of training has been carried out in this way, it is difficult to demonstrate to employers the value in supporting their workers to attain a higher qualification level. Furthermore, there is a need to enhance the evidence base (of skills development and productivity) by using metrics that are relevant to businesses, such as profitability; provide targeted and focused training support that is aimed specifically at companies in order to enhance their productivity performance. It has to be noted that the skills development needs for construction companies varies considerably given the heterogeneous nature of the construction sector. It is however imperative that if companies see the benefits of training to their business then they would have carried it out anyway whether or not they had support for it in the form of training grants.

There is evidence to suggest that construction employers would have carried out exactly the same training even if there was no training grant available (see ConstructionSkills, 2006). As such, there is a need to ensure that support provided to companies training is targeted to the areas that are potentially most useful to a business, such as the development of a training and development plan, management training. This brings into play the ‘Train to Gain’ scheme, which was set-up as a service offering all employers workplace training to meet their needs. There is a need to ensure that companies would undertake the required training activities as opposed to assessing and accrediting skills of their existing workforce (Shepherd, 2008). Therefore, there is a need to ensure that Train to Gain implementation is reviewed and monitored to ensure that it achieves its intended purpose that was set-out initially. Indeed a thorough evaluation of the programme, beyond mere satisfaction of employers can provide insights into the true impact of the scheme especially on companies’ performance or even profitability.

Moreover, the findings of this EngD have demonstrated that more profitable companies engage more in management-related training. This is consistent with the notion that leadership and management skills can indeed be a plausible mean for enhancing business performance.

5.6 Implications for the industry

Undoubtedly, there are a lot of opportunities available to construction companies in order to support the skills development of their workforce. As mentioned above, these include training grants and various skills and training schemes. Most recently, the government promised the allocation of £300m to train workers in sectors with skills shortages, where the share of the construction industry was £133 million – more than a third (Shepherd, 2008).

It is imperative for construction companies to capitalise on those opportunities and make best use of them if it is to address the on-going problem of skills shortages across various construction occupations, such as, plumbers, carpenters and joiners. It follows that there is a need to invest in the future skills development of the construction workforce through apprenticeship schemes in order to meet the projected future growth of the industry. Notably, there is evidence to suggest that the influx of migrant labour following EU Accession has helped in alleviating pressures on the construction labour market (Paul, 2006), but this situation is not sustainable as these migrant workers are staying in the UK on a temporary basis and might go back their home countries at some point when the economic situations in their country of origin has improved, i.e. backward migration.

Not only would businesses need to consider skills development through attracting new entrants (as demonstrated by the findings of this EngD) but also in developing the skills of their existing workforce. This becomes important if businesses want to consider skills as a vehicle for attaining productivity improvements. In particular, companies with low productivity levels and who do not claim training grants may consider applying for training grants as an option for attempting to address its productivity performance problems. Again, this should be embarked on if skills development or training is seen as the remedy to their productivity performance problem. This might entail companies rethinking or reviewing its existing work organisation or practices and then identifying areas for further development, such as investment in the training of using a new piece of equipment or new IT system to streamline communications for procurement.

As mentioned above, businesses have to approach training in both a proactive and structured manner. It is important for companies to embrace this voluntarist approach, for realising the optimum potential of their business as well as surviving historically tight labour market conditions. In light of the findings of this EngD, this might mean considering areas of training that involves: developing a training and development plan, management training, and qualifying their existing workforce to a formally recognised qualification.

Currently, there are low levels of labour market regulation in Britain but the Government's recent Leitch Review of skills point towards potential regulation and reinforcement of workforce training, such as workers achieving at least a Level 2 qualification, by 2014. There is also evidence to suggest that the government intends to introduce legislation which would entitle individuals to take time out of work in order to train (Kingston, 2008). As such, construction businesses should be proactive now in rethinking and addressing the skills development needs of their business strategically as opposed to being reactive and coerced to comply with future government legislation.

This is a choice a construction business has to make in order to brace itself against the imminent development of these legislations, before or if they come into force, particularly when considering the on-going importance of skills development on the government agenda as a key driver for productivity performance.

The synthesis of the research undertaken, in light of the aforementioned objectives, was the most challenging task of the EngD research given the dynamic nature of the government skills policy environment. This is explained by the fact that the government views skills as a key lever for enhancing productivity performance across all sectors of the economy.

The papers published over the course of the EngD have provided the main findings of the research. It was then important to view these findings in the context of the recent policy developments, particularly the recommendations outlined in the Leitch Review, in order to contribute to the current skills policy debates.

5.7 Conclusions

Skills development is regarded as a key driver for productivity performance. This idea should be treated with caution since the findings of this research have demonstrated that the relationship between skills development and productivity is tenuous particularly when considering the employment structure of the construction industry (in terms of both company-size and sub-sectoral composition). Skills development, e.g. through training activities, should be targeted and focused in order to yield any potential productivity gains. At the same time, it has to be recognised that other factors, such as work organisation and levels of capital investment, may need to be addressed in concert when considering productivity performance, and as such skills development should only be regarded as an enabler or a catalyst for bringing about productivity improvements.

There is a need to consider that pursuing skills development does not necessarily mean that such skills are directly transferred or deployed in the workplace in such a way that would bring about the proclaimed productivity improvements. Issues such as employee motivation and the context of the organisation in which they are working are vital factors if the efforts of skills developments are to be further progressed and have a positive impact on a business. This warrants further research in order to unpack this complexity of the transfer and utilisation of skills development in the workplace.

Yet the argument is that if the business need of skills development is visible to employers then they would take ownership of the training activities required and will allocate the required resources for it, and arguably will not wait for coercion to train. As such, the benefits of training in relation to productivity performance need to be viewed in the context of a business activities, plan and strategy - given the diverse and disparate needs of construction companies.

SSCs should seek to relay the employers voice to government through carrying out research that clearly demonstrates the ‘true’ benefits of training to employers in a meaningful way rather than using the traditional approach of surveying employers view on the benefits of training without any concrete understanding of the real or actual contribution of training activities to their productivity performance – accounting for both the size and the nature of the activity of their business as well as the external environment (such as market competition) in which they are operating.

5.8 Research limitations

This EngD research has examined the assumption of skills development in relation to productivity performance from different perspectives. This is very important to mention because the factors that limit companies’ productivity, such as profitability, may amount to much more than skills development, such as the level of capital investment and technology. Thus, skills development is not a panacea for a company’s productivity or performance problems. For example, Keep and Mayhew (1999) reported that the Rover Group has invested heavily in skills through apprenticeship schemes but this was not sufficient to avoid heavy losses.

They contended that the payback for investment in skill may take a long time and may only be realised in conjunction with other changes, such as investment in new plants and machinery. As such, it is crucial to point out that addressing skills as a means for dealing with performance problems could be a misdiagnosis that can lead to expensive remedies, some of them are very expensive” (Keep, 2006). Thus, training could be an expensive or irrelevant remedy if the productivity-related or wider performance problems are attributed to some other factor rather than skills or training.

Qualifications are commonly regarded as a proxy for skill. O’Mahoney and De Boer (2002) argued that this view has its shortcomings because “many skills may be acquired by informal on-the-job training and remain uncertified”. At the same time, qualifications may not be enough for delivering skill needs at the workplace as “formal education addresses approximately 30% of the knowledge base required by workers. The remaining 70% comes from ongoing training that is designed to meet the specific needs of the incumbent worker” (Longmore, 2002). This means that qualifications on their own may not be a true reflection of the level of skills possessed by the workforce. Green *et al.* (2001) explained that there however is an understandable tendency of policy-makers and researchers to slip into equating formal qualifications and frequency of training, which constitute indirect measures of skills, to the process of skills formation. This could perhaps be attributable to the fact that official education and training statistics (LFS) use qualification levels as a measure of skills levels. Indeed it is best to regard qualification levels as only indicative to skills levels.

Furthermore, there is always the assumption of the ‘transfer of skills’ occurring in a positive way. This means that the skills learnt through a qualification would be transferred to the workplace contributing to productivity gains. The transfer of skills into the workplace is a complex process which is a function of the so-called model of capability, see Tamkin *et al.* (2004), whereby workers need to be motivated enough to be able to deploy the new skills they acquired through training, then there should be an opportunity available in the workplace for deploying such skills which would in turn lead to a successful utilisation of those skills. This would however be based on the assumption that actual learning and skills development has taken place as a result of the training activity that was undertaken.

Finally, the evidence of improvements which accrue from investment in skills development would undoubtedly be broader than straight output improvement, such as enhancing productivity. The spin off benefits of a better trained workforce can include improvements in behaviour and attitude, interfacing between trades etc – which are known as 'externalities' and may not be necessarily confined to productivity performance.

5.9 Areas for further research

The research undertaken over the course of this EngD has examined the relationship between skills development and productivity performance of construction companies. Whilst this focus stems from the government skills policy preoccupation with skills development as a driver for productivity performance, skills are only one important factor affecting productivity performance – as mentioned above.

As such, there is a clear need for further research to reveal the real contribution of skills development (in relation to other factors) to productivity performance within the context of construction businesses. It is envisioned that the creation of the unique dataset (which combines grant/levy data with business financial performance) could act as a springboard for further research. This dataset could be used to assess the contribution of the amount/type of training grants to financial performance in relation to other factors.

This might be done through conducting an econometric analysis which could take into account various characteristics of firms (such as size, industry sub-sector and location) in addition to the amount of levy they paid. Additionally a qualitative approach could be employed to provide an in-depth understanding of skills development as a governing factor affecting a company's productivity performance.

This might involve identifying specific HRM policies in addition to understanding the utilisation of training grants in companies and its contribution to offsetting the cost of training and hence quantifying more specifically the impact of training grants.

Future research also needs to explore how far training is being transferred in the workplace. There is often the assumption that if training has taken place then it has been transferred in the workplace successfully and resulting in productivity gains. In fact the training process is a complex one because the incidence of training does not mean that learning has taken place. Moreover, the transferability of training outcomes to the workplace is a function of the opportunities available for deploying the skills learnt over the course of training, in addition to the motivation of workers to deploy such skills.

Finally, there has to be a more comprehensive application of the evaluation of training activities, such as existence of levy/grants system, through employing the well established framework of Phillips and Phillips (2008) (See Appendix 3: Paper 3). Indeed a formal evaluation of training in that manner would provide a new perspective to various stakeholders in the skills policy arena on the true impact of training and skills development, which warrants further research.

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Appendices

Appendix 1: Paper 1

Abdel-Wahab, MS, Dainty, ARJ and Ison, SG (2006) How Productive is the Construction Industry? In Boyd, D (ed) proceedings of the 22nd Annual ARCOM Conference, 4-6 September, Birmingham, UK, Vol.1, pp11-19, ISBN 0-9552390-0-1.

HOW PRODUCTIVE IS THE CONSTRUCTION INDUSTRY?

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Consistent and reliable construction statistics are crucial for ascertaining the industry's productivity performance. A reliable productivity estimate is essential to establish a reference point for understanding the factors that impinge on productivity performance (e.g. workforce skills). Reviewing the existing construction statistics, alternative productivity estimates were derived based on different statistical sources. This variability presents a distorted and confusing image of the industry's productivity performance and constraints the understanding of any future improvements. Also, it is questionable that the existing data provide an adequate reflection of the nature of the industry. Therefore, there is a need for a thorough understanding of various statistical sources and their underlying assumptions in order to derive a reliable productivity estimate.

Keywords: estimates, productivity, reliability, statistics, variability.

INTRODUCTION

Gaining an understanding of the performance of the construction industry is predicated on reliability and consistency of published statistical data. This presents a potential risk and obstacle for informing decision making and policy application at a macro-level. It is also essential for moving away from rhetorical commentary on the industry which is not founded on a thorough analysis or at least is in need of serious qualification (Pearce, 2003). Kristiansen *et al.* (2005) pointed out the tendency of those involved in various ministries to believe that their critical reports on the construction industry provided the real resolution to the industry's problems without looking into what actually was going on. It follows that the wealth of published statistical data should be the subject of further analysis and scrutiny to better understand the 'Real' performance of the construction industry.

Briscoe and Wilson (1993, p.33) reported the variation of employment estimates between the Department of Environment (DoE) and Department of Employment (DE) from (1965-1990) and the underlying assumptions for each. Yet, more than a decade later, the same problem persists if not becoming even more complicated with increasing sources reproducing the same data, e.g. Department of Trade and Industry (DTI) and Labour Force Survey (LFS) produce two different estimates of the size of the construction workforce.

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This has a knock-on effect on construction labour productivity estimates as will be further discussed. Therefore, this requires a continuous review of the usefulness and reliability of the published construction statistics, and the resolution of the discrepancies between different registers (Briscoe, 2006). This paper reviews existing datasets, deriving alternative productivity estimates.

MEASURING PRODUCTIVITY

A first step in studying statistical data relating to productivity is to have a consistent and clear measure. Table 1 provides a good reference for identifying various productivity measures using combinations of different outputs and inputs. Productivity used in this paper refers to the labour productivity, based on gross output and value added, which are highlighted below.

Table 1: Productivity measurement

Type of output measure:	Type of input measure			
	Labour	Capital	Capital & labour	Capital, labour & intermediate inputs (energy, materials, services)
Gross output	Labour productivity (based on gross output)	Capital productivity (based on gross output)	Capital – labour MFP (based on gross output)	KLEMS multi-factor productivity
Value-added	Labour productivity (based on value-added)	Capital productivity (based on value-added)	Capital – labour MFP (based on value-added)	—
Single factor productivity measures			Multi-factor productivity (MFP) measures	

Source: Schreyer, 2001

These measures were chosen because data based on gross output and value-added are readily available through published statistical data. Value added refers to a firm's (value of sales) less all the cost relating to producing that output (e.g. materials and equipment), which corresponds to the net output. On the other hand, gross output is a measure of total output without deducting costs. This distinction is important as it shows a considerable variation in productivity estimation, for example in 1983, gross output per manual worker rose from £34,000 to £47,900 in 1997, which could be explained by the increase in offsite production and change in the type of buildings undertaken as compared to work in the early 1980s (Ive and Gruneberg, 2000).

METHODOLOGY

Productivity estimates derived in this paper are based on gathering data from published statistical sources to-date. This included: Labour Force Survey (LFS), Annual Business Inquiry (ABI), Department of Trade and Industry (DTI), and UK National Accounts (Blue Book). The data gathered involved two components: 1) Employment estimates and 2) Gross Value Added (GVA), then 2) was divided by 1) to calculate construction labour productivity as GVA per worker. Each component will be further discussed in the following sections subsequently.

EMPLOYMENT ESTIMATES

Two approaches exist for estimating the size of the construction workforce: employers and household surveys. Employer's surveys ask employers in construction how many people they employ whereas household surveys ask households about their jobs and if it involves construction. The LFS is an example of the former and the ABI is an example of the latter. Theoretically, as there is only one construction workforce, employers and household surveys should provide the same estimate. This is seldom the case as each adopts different research method. Allsopp (2004) pointed out that the divergence between the ABI and LFS employment estimates, across different sectors, should be treated as a matter of urgency.

ABI includes enterprises employing 20 or more workers, which do not take into account self-employed that represent considerable proportion of employment within construction. An advantage of the LFS is that it is good in picking up workers in the 'black economy' (Blake *et al.*, 2004). Also, it provides a continuous time series that would help in conducting a meaningful historical analysis of the construction workforce. Finally, it is constantly revised and enhanced as the Office of National Statistics (ONS) has a strategy to minimise the discontinuity and disruption to the survey (see LFS user guide, vol. 1 Section14, 2003).

Table 2 below shows multiple estimates of the size of the construction workforce, which is based on gathering data from various government statistics sources. The gaps indicate a discontinuity in the time series, which simply means that the data is not available for that particular year. This was the case with the ABI data which was first produced in 1998 replacing the Census of Production (CoP).

Table 2: Employment estimates time series (1990-2005)

Year	Employment estimates (000s)				
	LFS ¹	ABI ²	OECD Stan ³	ABI & LFS ⁴	DTI ⁵
1990	2,141		2,261		1,812
1991	1,948		2,074		1,626
1992	1,783		1,858		1,475
1993	1,685		1,753		1,398
1994	1,864	GAP	1,753	GAP	1,375
1995	1,839		1,738		1,382
1996	1,825		1,724		1,378
1997	1,874		1,685		1,392
1998	1,907		1,751		1,418
1999	1,931	1,376	1,757	2,035	1,403
2000	2,004	1,388	1,815	2,054	1,535
2001	2,057	1,400	1,820	2,026	1,557
2002	2,074	1,386	1,964	2,049	1,594
2003	2,082	1,361	2,069	2,067	1,613
2004	2,167	1,378		2,150	1,754
2005	2,229	GAP	GAP	GAP	1,760

1 Labour Force Survey (LFS) including both directly employed and self-employed.

2 Annual Business Inquiry (ABI) which replaced the Census of Production in 1998

3 OECD Stan database

4 ABI data along with self-employed from the LFS

5 Department of Trade and Industry (DTI)

In 2003, ABI estimates the construction workforce at about £1.4m as opposed to £2m by the LFS, which is almost 1.5 times the ABI. This is because the ABI does not take into account the self-employed. This explains the use of a combination of ABI and self-employed from the LFS in Table 2 above in an attempt to generate a more realistic estimate of the size of the construction workforce. Nonetheless, the ABI data does not provide an appropriate time series for studying historical trends of productivity.

GVA ESTIMATES

The second component that will be used in calculating productivity is the GVA. The ONS website defines GVA as “*the difference between output and intermediate consumption for any given sector/industry. That is the difference between the value of goods and services produced and the cost of raw materials and other inputs which are used up in production.*” Two published sources exist for GVA. One comprises Annual Business Inquiry (ABI) - formerly known as Censuses of Production (CoP). The other is National Accounts value added, published after reconciling three sources of data: factor incomes data; aggregate final expenditure data; and output (production) data, which is known as the ONS (Blue Book). The ability to subject production inquiry-based data to cross-checks with expenditure, income and input-output data for other industries, gives National Accounts industry value added estimates a considerable advantage in terms of likely accuracy (Ive *et al.*, 2004). A trend of both GVA datasets is shown below.

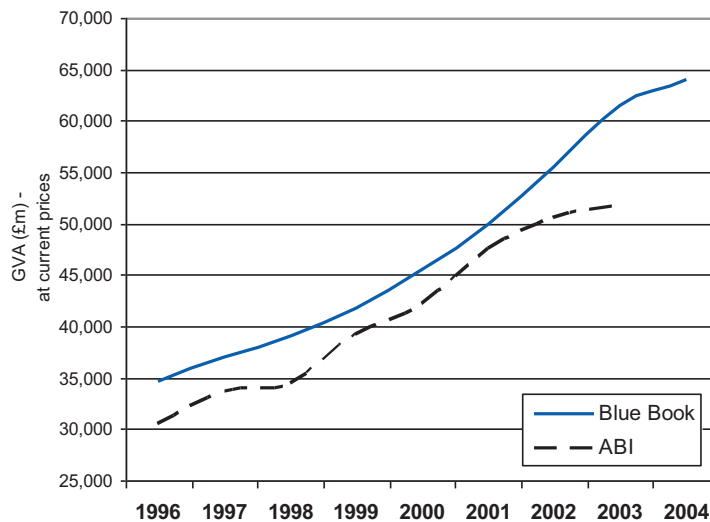


Figure 1: Comparison of GVA datasets

Clearly, figure 1 shows that both estimates have an increasing trend. It has to be noted that GVA from the ABI is always calculated at current prices of that particular – latest year of ABI data available (Daffin and Lau, 2003). However, a common problem with the ABI data is that it only includes figures of enterprises with 20 employees or more, which is not representative of the value added of construction activities produced by the entire workforce.

Also, the ABI data always lags behind Blue Book due to cross checking with employers, so the latest data available is for 2003 (see statistics.gov.uk). Finally, the discontinuity in the data, which started at 1998, would be an obstacle for carrying out a meaningful analysis of productivity over a longer period of time (see Ive *et al.*, 2004).

VARIABILITY OF PRODUCTIVITY ESTIMATES

Productivity is calculated by dividing the Gross Value Added (GVA) by employment, where accuracy would depend on the reliability and consistency of the datasets used. Various estimates derived using combinations of employment and GVA from different statistical sources, in addition to DTI gross output figures, are shown in Table 3 below.

Table 3: Combinations of productivity estimates using various employment and output estimates, 2003

Net/Gross Output*	Productivity (£) using employment from:				
	LFS	ABI	OECD	ABI&LFS	DTI
GVA Blue Book	29,561	44,657	29,746	28,626	38,160
GVA ABI	42,254	27,970	28,142	27,085	36,098
DTI Output	44,508	67,237	44,787	43,099	57,454

* All net/gross output is at 2003 current prices.

Table 3 shows 15 different productivity estimates for construction. Variability in estimates reaches almost 150% between DTI/ABI and ABI/ABI&LFS. If the Constructing Excellence Key Performance Indicator (KPI) for productivity is included (where the median value added per employee was £31,000 in 2003) then a total of 16 estimates exist for productivity. Therefore, this requires caution when attempting to draw conclusions on the industry's productivity performance. Nonetheless, this complicates any assessment of the factors that impinges on productivity performance as there is no one clear reference point.

INDUSTRY COVERAGE

It is important to assess the appropriateness of statistical data in terms of industry coverage. Does the published data reflect the reality of the construction industry performance given its fragmentation and various sub-sectors? This brings in the issue of heterogeneity of construction and in that respect, the industry's footprint with regards employment and productivity across various sub-sectors, will be explored. These were chosen based on availability and reliability of existing data.

For example, GVA from the Blue Book does not provide a breakdown by industry sub-sectors. Therefore, output by sub-sector from DTI was used along with employment by-sector, based on a recent CITB survey of employment in construction, to calculate productivity. Also, LFS data were used for estimating employment within construction footprint.

Industry footprint

Standard Industrial Classification (SIC) codes are used to define the footprint of various sectors across the economy. According to published statistics, construction industry falls within the SIC45 classification, which includes the following activities: site preparation, building of complete constructions, building installation and completion, and renting of construction of demolition equipments. This excludes Architectural and Engineering activities (SIC74.2) - representing a narrow definition of the industry's footprint. Therefore, CITB-ConstructionSkills, construction Sector Skills Council- SSC, defines construction footprint as SIC45 (excluding 45.31, 33 - Installation of electrical wiring and fittings activities and plumbing respectively) and SIC74.2.

This is problematic for the estimation of the size of the construction workforce from the LFS as it does not permit 4-digit level of disaggregation of SIC codes - due to its relatively small sample size as compared to the ABI. To address this problem, the CITB-ConstructionSkills produced a time series using ABI data to estimate the proportions of SIC (45.31 and 33) and SIC74.2 as a percentage of the construction workforce, which were found as 20% and 80% respectively. Thus, the LFS employment estimate was reduced by 20% to eliminate SIC45.31 and SIC45.33. In addition, 80% of SIC74.2 was added to account for professionals within the ConstructionSkills footprint. Then, the employment within ConstructionSkills footprint in 2005 came to 2,037,935 as opposed to 2,228,649 – based solely on SIC45. Assuming that the GVA from the Blue Book remain unchanged then clearly the productivity estimate for ConstructionSkills would be an underestimate.

Industry sub-sectors

Table 4 below shows considerable variations in productivity across different industry sub-sectors. In aggregate productivity in non-residential buildings is nearly 1.6 times that of house building. This set of data is based on gross output from DTI, which means that an increase of offsite production would result in higher levels of output and thus not necessarily reflecting net output from construction activities. However, it is indicative of the variations of productivity performance across different sub-sectors. It has to be noted that the industry sub-sector breakdown in the CITB employment survey uses the classification of non-residential as equivalent to all other type of work (apart from housing) whether public or private as used in the DTI output breakdown. Also, civil engineering is equivalent to Infrastructure in the DTI. These variations in industry break down reflect the convention or the norm amongst contractors for naming particular types of projects, which was unveiled during the pilot CITB survey for employment by-sub-sector.

Table 4 serves a rough guide of variations of productivity performance in 2005 across different sub-sectors due to the unavailability of net output data by industry sub-sector from the Blue Book. So, the variations in sub-sectors productivity performance exist but how much exactly is not quiet known. This makes it difficult to come up with one aggregate figure representing a heterogeneous sector as construction.

Table 4: Productivity by-sector, 2005

Employment	House building	Non-residential building
New Build	359733	185514
Repair and Maintenance	181151	240236
Total	540884	425750
<i>Output (£million) – 2005 prices seasonally adjusted</i>		
New Build	21,063	31,851
Repair and Maintenance	23,937	23,657
Total	45,000	55,508
<i>Productivity (£output per worker)</i>		
New Build	£58,552	£171,691
Repair and Maintenance	£132,138	£98,474
Total	£83,197	£130,377

Sources:

- **Employment:** CITB-ConstructionSkills employment Survey, 2005
- **Output:** Department of Trade Industry (DTI), 2005
- **Productivity:** Calculated by the authors' by dividing output by employment

IMPLICATIONS

The availability of various and conflicting statistical sources makes it difficult to assess the performance of the construction industry at large. Accordingly, it is doubtful that an informed decision and policies could be taken to further advance and develop the construction industry. This duplication of effort brings about entropy as opposed to negentropy, e.g. this effort would be rather spent on filling/addressing the weaknesses of such surveys rather than seeking to reproduce more of the same data, e.g. employment estimates. The assessment of the industry productivity performance is a real problem and it requires a great effort to come up with a reliable estimate. This means that a major methodological review is required for the data gathered and not producing more of the same data, which add to the confusion and has little value.

For example, the Department of Trade and Industry (DTI) productivity KPI (key performance indicator) is based on a survey sent out to employers and it came up with similar estimates provided by existing secondary sources. The 2004 estimate of productivity based on Blue Book GVA and LFS employment was £31,206 as opposed to £32,600 based on the DTI KPI. This is a vivid example of re-inventing the wheel and duplication of efforts. The DTI KPI was intended to provide a benchmarking tool so that contractors could compare their performance with the industry's average. Arguably, the wealth of existing secondary data could have provided this benchmark for the industry productivity performance. It seems that the easiest and most obvious answer is to send out surveys to employers.

This is a symptom of inefficiencies in research in that enterprises complete questionnaires periodically for various often uncoordinated surveys and censuses resulting in a state of 'Survey-fatigue'. There is a need to rationalise and streamline existing procedures to be more efficient and thus minimise cost and duplication of efforts and be of more value. A regulation of the process is a fundamental requirement especially as it seems to be more of a commercial endeavour than seeking research rigour. Therefore, this requires a shift in the way of thinking about construction statistics in a more organised way within a coordinated framework that would reflect the alignment of various stakeholders' interests. It could be argued that different datasets serve different purposes, but using the example of size of the construction workforce; why would one need more than one estimate for the same workforce!

POSSIBLE SOLUTION

Ofori (1990) introduced the idea of a central bank of data in order to ensure consistency of data and avoid duplication. The office of national statistics (ONS) may be recognised as playing this role, but the department of trade and industry (DTI) holds information that is construction industry specific. This presents an unnecessary duplication of efforts as Ofori (1990) pointed out "several agencies collect data on the construction industry in different formats and in relation to different criteria, even when the subjects are similar". An example of this is the various estimates of the size of the construction workforce in the UK. This begs the question of the need of multiple estimates of the workforce and only one figure should be arrived to and it would no doubt serve the purpose of most organisations and stakeholders. This would result in enormous cost savings and a reduction in the duplication of effort. In a nutshell, to provide a one-stop shop. There are joint plans between the DTI and ONS to transfer the responsibility of the construction statistics from the DTI to the ONS and it is thought to be in place by 2007. This will require different stakeholders to work collaboratively to align their requirements for optimum utilisation of data.

CONCLUSIONS

The assessment of the construction industry productivity performance is problematic with the existence of multiple data sources. It is essential to address the strategic issues of concern to the industry (productivity) and focus on closing the gaps rather than producing the same data. Unreliable statistical data could be misleading and has a detrimental effect on decision making and policy formation especially with regards to improving productivity. There should be more effort put towards improving and understanding the gaps within the existing statistical data before attempting to assess the construction industry performance. It is imperative that resources are limited and this may provide limitation to the data collected.

Arguably, more resources should be devoted to address the most significant datasets which are fundamental to the development of the construction industry and the economy as a whole, e.g. productivity. This should feed into an integrated framework and systematic approach for data collection that would go under an umbrella of a central databank for construction that is regulated by the government (ONS), which would reflect the interest of different stakeholders.

It should not be a case of an open-door policy to sending surveys to employers but rather the process should be effectively managed and coordinated. This is essential for employers to feel that they are getting value out of these surveys and not merely disrupting their business activities and being another burden.

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Appendix 2: Paper 2

Abdel-Wahab, MS, Dainty ARJ, Ison SG, Bowen, P. and Hazlehurst, G. (2008) Trends of skills and productivity in the UK construction industry, *Journal of Engineering, Construction, and Architectural Management (ECAM)*, **15** (4), pp.372-382.



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Trends of skills and productivity in the UK construction industry

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Abstract

Purpose – UK government policy has emphasised the role of skills development and training as a means of improving productivity performance across all sectors of the economy. The purpose of this paper is to assess the appropriateness of this policy within the context of the construction industry, in light of the recently published statistics.

Design/methodology/approach – A trend analysis of construction productivity (measured by Gross Value Added/worker) and skills indicators (qualification attainment and training) was conducted over the period 1995-2006.

Findings – There is inconsistency in the industry's productivity performance, despite the overall increase in qualification attainment levels and participation rates in training over the same period. However, the year-on-year change in the participation rate of training was not consistently associated with an improvement in productivity performance.

Originality/value – It is argued that the effective utilisation of skills rather than mere increase in the supply of skills is a key to bringing about productivity improvements. Indeed future policy makers decisions should focus on addressing other influences on productivity performance such as work organisation and management practice to support further development and progression of the UK construction industry.

Keywords Social trends, Skills, Productivity rate, Government policy, Construction industry, United Kingdom

Paper type General review

Introduction

Improving productivity performance is a primary driver of the UK economic performance and long-term sustainable competitiveness (HM Treasury, 2006). Accordingly, the UK government has developed a strategy for improving productivity, which focuses on five key drivers: improving competition, promoting enterprise, supporting science and innovation, raising UK skills, and encouraging investment (Budget Report, 2005). Notably, government reports give the impression



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that skills hold the key to productivity improvement, a view, which is supported by its agencies. For example, the Sector Skills Development Agency (SSDA) Strategic Plan 2005/08 (SSDA, 2005, p. 9) stated clearly that increasing participation levels in training (which is one of the common skills indicators adopted by the government) by 5 per cent points could increase productivity by 4 per cent – boosting GDP by £40 billion.

Most recently, the UK government published the Leitch Review of Skills (2006). The review was commissioned in order to assess the UK skills needs by 2020 in order to remain competitive in a rapidly changing global economy. It has to be noted that this was a clear indication of the importance given to skills development and training in policy discourse as a means of improving productivity across all sectors of the economy. There were no similar reviews carried out with respect to the other four drivers, mentioned above, in relation to their potential impact on improving productivity performance across different sectors of the economy. As for skills, the Leitch Review (2006, p. 3) claimed that “UK skills base remains weak by international standards, holding back productivity, growth and social justice ... there is a direct correlation between skills, productivity and employment.”

The UK government set-up a network of Sector Skills Councils (SSCs) in 2003 in order to promote its skills agenda within the context of all sectors of the economy. SSCs are responsible for: addressing skills gaps and shortages; improve learning supply including apprenticeships, higher education and National Occupational Standards (NOS); taking appropriate strategic actions to increase productivity – through proactively engaging with employers (SSDA, 2007).

Given the government’s emphasis on sectoral perspective in implementing its skills and productivity agenda, this paper examines the trend of construction industry productivity performance in relation to its skills profile – over the period 1995-2006 – through analysing the most up-to-date published construction statistics.

This paper commences with a literature review, which discusses the relationship between skills development and productivity performance. Next, the research method will be described along with a description of the datasets used. Findings of the analysis will be reported and then discussed in light of similar findings in the literature.

Factors affecting productivity

Previous research has attempted to identify and account for the range of factors that affect construction productivity performance. For example, Horner (1982) found that there are ten factors which affect construction productivity: quality; number and balance of labour force; motivation of labour force; degree of mechanisation; continuity of work; complexity of work; required quality of finished work; method of construction; type of contract; quality and number of managers and weather. Olomolaiye *et al.* (1998) also identified external and internal factors pertaining to construction productivity performance. External factors included: design, weather, changes made by client, level of economic development and political stability. Internal factors included: management practice, technology and labour skills and training.

Despite the wide spectrum of factors affecting construction productivity, it is notable that workforce skills development and training featured as a commonly cited factor in many productivity studies and industry reports (see for example Lavender, 1996; Egan Report Rethinking Construction, 1998; Naoum, 2001).

There is a surfeit of research evidence, which has suggested that skills are an important factor affecting productivity performance in the construction industry. For example, Rojas and Aramvareekul (2003) found that management skills and manpower issues are the two areas with the greatest potential for affecting productivity performance. Clarke and Wall (1996) compared the process of house building in the UK in relation to Germany and The Netherlands, where they found that the process in the UK depends on a lower level of skill than in Germany, which could explain the variation in productivity performance. Moreover, Arditi and Mochtar (2000) argued that poor quality on projects results in rework which causes drop in productivity levels. They explained that poor quality emanated from the scarcity of a properly trained workforce, which was caused by inadequate levels of training, in addition to the poor quality of training provision that resulted in such skills shortages. The case of workforce skills development and training as a significant factor for improving construction productivity performance is well rehearsed in the literature.

Although the existing literature does not go beyond demonstrating that skills development and training are generally important for the industry, it is not clear whether or not this view is reflected and/or captured by officially published statistics. This makes it problematic for policy makers to see how the construction industry's overall productivity performance is changing over time in relation to its skills profile. The lack of a holistic view of the industry and how it has changed over time stems from the under utilisation of official statistics in research. Neely (2004) argued that the use of the data collected by the Office of National Statistics (ONS) has not been fully exploited in research. He added that it is appropriate to invest time in exploiting these data rather than asking members of the industry to provide yet more data.

Thus, the analysis of official statistics is essential in offering evidence and seeking the facts about the change taking place in the construction industry over time – an approach which was advocated by Pearce (2003). This becomes particularly crucial with the government policy and research evidence available pointing towards skills as being a key lever for productivity performance. Therefore, this paper examines the appropriateness of this assumption by looking at the change in the industry's skills profile and productivity performance over the past 12 years.

Research method

The approach adopted in this paper is based on an analysis of the most up-to-date published construction industry statistics. A trend analysis was conducted to study the change in the industry productivity performance; employment levels and skills base – over the period 1995-2006. Productivity was measured by Gross Value Added (GVA)/worker. This measure was chosen because it shows the net value (output) added from construction activities to the economy.

Participation rates in training and qualification attainment levels were used as measures of the industry's skills profile – which are commonly used in government policy research in relation to skills and productivity. These data were extracted from the Labour Force Survey (LFS) (2006). The LFS is a “quarterly survey of households living at private addresses in Great Britain”, which provides “information on the UK labour market that can be used to develop, manage, evaluate and report on labour market policies” (Office of National Statistics, 2007). Official productivity figures for construction were based on the most recently published UK National Accounts (2006),

which is also known as the Blue Book. UK National Accounts produces quarterly and annual estimates of sectors financial accounts based on the Standard Industrial Classification (SIC) definition of each sector, where construction is defined by SIC45.

Findings

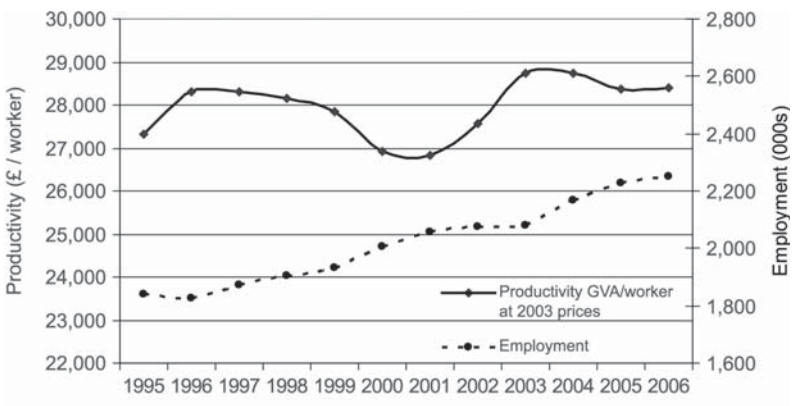
An overview of construction

According to the Department of Trade and Industry (DTI) (2006), output of the construction industry (at 2000 prices) has increased from £63bn to £81bn between 1995 and 2006 – which is equivalent to an average annual growth rate of 1.6 per cent. This showed the longest sustained output growth, with the exception of a slight drop in 2005, since the early 1990s.

Thus the period for studying the change in the industry’s productivity performance in relation to its skills profile was marked by an overall stability in the industry’s workload. This is important since the poor engagement in skills development and training is often attributed to the cyclical nature of the construction industry in addition to its structural barriers, i.e. spread of self-employment and large number of small firms in the industry (see Gann and Senker, 1998). Whilst the structural barriers remain, which will be discussed later, the instability of the industry workload should not be an issue when considering training and skills development over this time period.

Productivity and employment

Figure 1 shows the trend in productivity and employment over the period 1995-2006. In 1996, productivity increased by 3.6 per cent (compared to 1995) when there was a slight drop in employment level. When considering productivity performance after 1996, a mixed picture became apparent. During 1996-2001, productivity consistently declined with the worst drop-taking place in 2000, whilst there was a sustained growth in employment – perhaps an increase in employment was to match the sustained output growth during that period. By contrast, during 2002-2003, there was a considerable improvement in the industry’s productivity



Sources: Labour Force Survey (LFS) and UK National Accounts 2006

Figure 1.
Productivity and
employment –
construction (SIC45)

performance when there was the slowest growth rate in employment. Finally, productivity levels dropped in 2004 and 2005 whereas it increased slightly by 0.12 per cent in 2006.

Considering the basic definition of productivity as a ratio between output and input, where labour is a key input to the construction process (which is largely regarded as labour intensive), an increase in employment levels did not necessarily lend itself to improved productivity performance. In fact, Horner and Duff (2001) found that an increase in crew size (number of workers), had a positive effect on productivity performance in construction projects – up to a certain point, i.e. optimum number of workers, then a further increase resulted in a drop in productivity. Given that productivity improvement is not merely a function of increasing the size of the construction workforce, it becomes important to assess the quality of the construction workforce over that period of time – which could be revealed by considering the industry’s skills profile over the same period.

Qualification attainment and productivity

Figure 2 shows that there was an increase in the percentage of workforce with NVQ (National Vocational Qualifications) Level 2 from 0.5 per cent in 1995 to 5 per cent in 2006 – which was calculated by dividing the number of workers who had NVQ Level 2 by the total size of the workforce. Similarly, the percentage of workforce with NVQ Level 3 has increased from 0.7 per cent to 5 per cent over the same time period, with the exception of a slight drop in 2000.

The association with productivity performance, when considering the effect of the year-on-year change, presented a mixed picture, as qualification levels were generally increasing over this period, yet this was associated with both increasing and decreasing periods of productivity performance.

Participation rate in training and productivity

During 1995-2006, there was an overall increase in participation rates in training by 20 per cent. The participation rate in training was calculated by dividing the number of

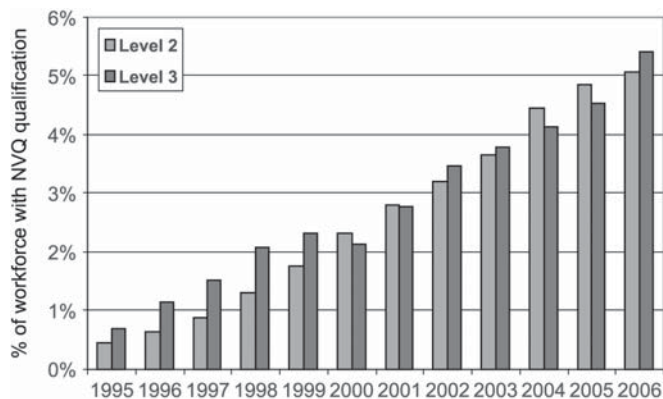


Figure 2.
Achievements of National Vocational Qualifications (NVQ) Levels 2 and 3 – construction (SIC45)

Source: Authors’ calculation based on Labour Force Survey (LFS)

workers who participated in any form of training activity (including both on-the-job and of-the-job training) by the size of the construction workforce for each specific year – using the LFS. This was associated with an overall increase in productivity of 4 per cent (from £27,328 in 1995 to £28,391 in 2006 – at 2003 prices). When considering the year-on-year change of participation rates in training in relation to productivity; a different picture emerged – as shown in Figure 3.

Clearly, there was no consistent increase in the participation rates of training in relation to productivity despite the overall increase between 1996 and 2006. The incidence of an increase in training was associated with a decrease in productivity in the following years: 1997; 1998; 1999; 2001 and 2004, whereas it was associated with an increase in productivity in 2002 and 2003.

Possible interpretation of these two contrasting findings suggest that training on the one hand is not a panacea for the industry productivity performance; on the other hand lower participation rates in training may potentially exacerbate the industry productivity performance. It becomes clear that there is a need to maintain an optimum/adequate level of training activity to ensure that the industry's productivity performance is not hampered by skills deficiencies.

At the same time, there is a need to ensure that training activity can help in producing a long lasting effect on productivity performance. With this in mind, it is necessary to consider the level of training activity with respect to the nature of the construction industry – particularly in 2005 which showed the lowest drop in training activity along with a decrease in productivity performance.

Figure 4 shows that employees working for small-medium-sized companies, i.e. companies with less than 250 employees, engaged in less training activity when compared to employees working for larger companies in construction. However, some employees working for small-medium-sized companies in other industries trained more than those employed by larger companies, such as those working for companies employing 25-49 workers.

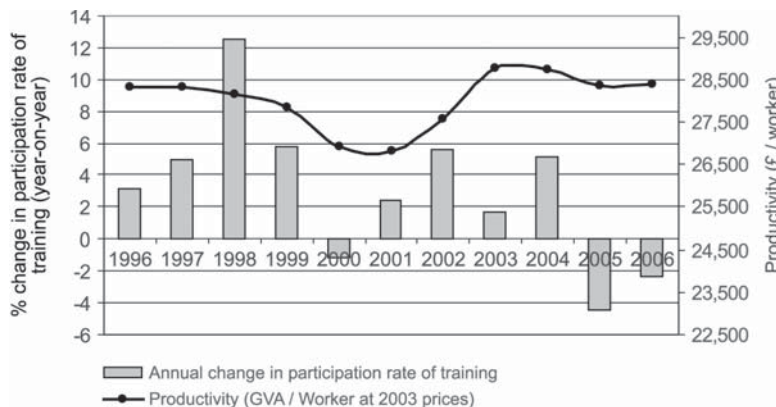
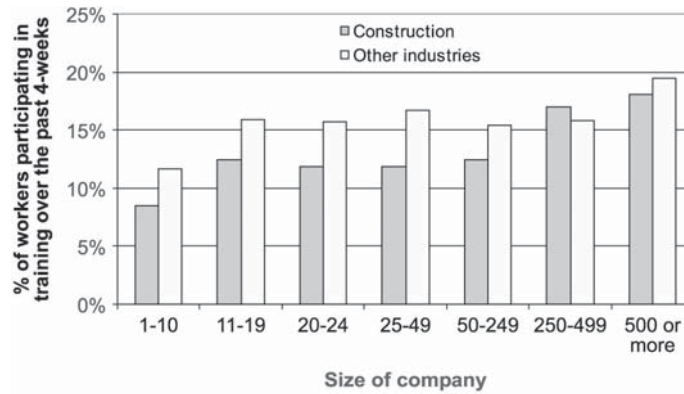


Figure 3.
Training and productivity
– construction (SIC45)

Source: Authors' calculations based on LFS data



Source: Labour Force Survey (2005)

Figure 4.
Participation in training –
by company size

Discussion

The construction literature showed that there is a general consensus on skills development and training as being important factors to improving productivity performance, although the same picture was not mirrored in the construction statistics. Indeed it depicted the contradiction between the claims founded on industry's opinion and the overall industry's skills profile and productivity performance – as captured by officially published statistics.

Increased qualification levels do not necessarily render itself to improved productivity performance within the construction industry. This makes the recommendations of the Leitch Review (2006, p. 5), which stated that increasing levels of qualification attainments (Levels 3 and 4) across all sectors of the economy would result in the UK being able to compete globally and improve its productivity performance, appear questionable. This becomes particularly crucial with the evidence underlying the relationship between qualification levels and performance, as cited by government research, relies largely on using indirect (proxy) productivity measure – namely earnings (see Tamkin *et al.*, 2004). It has to be noted that using earnings as a measure of productivity could be misleading due to variations in wage structure that could be attributed to occupational or gender difference (Elliott and White, 1993). So, if men earn more than women then would this mean they are more productive? Clearly, this is a wrong inference – which shows the limitations with using this measure for productivity. This undermines the notion that improvement in qualification levels will improve productivity – using earnings as a measure – particularly if it is not supported by direct productivity measures (gross value added/worker) within the construction industry.

This also shows the confusion in government policy of the role of skills (measured by qualification levels) as being a social good, helping people to become more employable and to attain higher earning levels, as opposed to being a business good aimed at improving productivity performance (see Keep *et al.*, 2006). Moreover, when focusing on skills as a driver for improving productivity it should be viewed in the context of the workplace in terms of how skills are being utilised (ACAS, 2007).

If more training what is its purpose? Is it related to productivity?

The increase in training levels alongside the drop in productivity levels suggests that training may have the reverse effect on productivity – contrary to the assertions in the literature and policy discourse as discussed above in the literature review. This raises the question as to what type of training activity has taken place to produce such an effect.

The ConstructionSkills Trainee Number Survey (TNS) (2006) can offer some clue as it reported that in 1998 there was an increase in the number of trainees/apprentices by over 20 per cent – from 29,240 in 1997 to 35,520 in 1998. In that same year there was a drop in productivity. Fellows *et al.* (2002, p. 129) argued that coaching apprentices (new entrants) is likely to be an impediment to productivity as more experienced workers have to take time out to teach them. As such, training more new entrants can potentially have a detrimental effect on productivity performance – particularly if there were many trainees on construction sites. Moreover, the Employer Panel Consultation (EPC) (2006), published by ConstructionSkills based on 1,000 depth telephone interviews that reports UK employers' view on topical issues in construction, found that the top reason for companies engaging in training activity was to meet health and safety standards. It becomes apparent that not all training activities are geared towards productivity improvement and therefore the notion of the broad concept of training as a means to enhance productivity, which is common in the UK skills policy arena, becomes unhelpful. It follows that there is a need to identify clearly the purpose behind undertaking training in the industry – as a prerequisite for understanding its potential effect on productivity performance.

Another explanation for the trend of an increase in productivity when training decreases might be that it could have been another factor that contributed to this productivity change, such as: work organisation on-site or level of capital investment, as opposed to training. If work is still carried out in the same way after training has taken place then it is unlikely that much change will take place in terms of improved productivity performance. Keep *et al.* (2006) argued that skills are used as a “scapegoat” to divert the attention away from other serious failings, namely in how people are being managed and motivated at the workplace. Furthermore, UK construction is still largely regarded as labour intensive as opposed to being capital intensive when compared to other industries or countries. Ive *et al.* (2004) found there was lower level of capital investments in UK construction when compared to Germany and the US. Syben (1998) mentioned that the high productivity production model adopted in Germany relies on highly qualified workers who know how to run a whole site and require only general instructions before carrying out the right work without supervision.

As such, the demand of higher skills levels, which could be attainable through training, has been linked to the firm/business context and not merely any training activity per se. The argument here is that it might have been something else that affected productivity if training increased and productivity decreased or may be the level of training taking place was not sufficient or the right type of training required to bring about improvement in productivity performance.

On the occasions when there was both increased productivity performance and training levels – it was sporadic (in 1996, 2002 and 2003). However, this fits with Dearden *et al.* (2000) view that a sector which engages in more training activity, conduct more Research and Development (R&D), employs more workers with higher skills is likely to attain higher levels of productivity performance. Nonetheless, the

non-uniform trend of training over the period (1995-2006) infers that this was unlikely to be the case given the lower levels of capital investments in the UK construction – particularly for an industry traditionally regarded with low levels of R&D investments.

Perhaps, the reform agenda of the Egan Report through promoting good practice across the construction industry may provide some explanation to such improved productivity. An alternative interpretation might be that the industry had to increase its productivity performance and overstretch its resources, given the skills challenges facing the industry (see Chan and Dainty, 2007) to cope with the pressures of increasing workload in the industry in these years. As a consequence, lower quality become inevitable causing productivity levels to suffer in later years, 2004 and 2005 – as poor quality of work result in rework and thus depressing productivity levels.

Nature of the construction industry and training activity

The employment and sub-sectors structure of the construction industry, i.e. heterogeneous nature, affect its skills profile and training activities – which may not necessarily be related to productivity performance. This was demonstrated by the findings in Figure 4. Considering the employment structure of the construction industry, the LFS (1995-2005) showed that employment is skewed towards self-employed – this is approximately 40 per cent of the construction workforce – which affects the level of training activity in the industry. Winch (1998) argued that the decline in the number of trainees in the industry is a function of the decline in direct employment and a growth in self-employment.

Furthermore, the construction industry is comprised of various sub-sectors, according to the Department of Trade and Industry (DTI) (2006) classification, which includes: housing; infrastructure; industrial; commercial and repair and maintenance. Each sub-sector is subject to different growth rate with respect to the changing economic conditions within UK regions. This may have an effect on the industry's workforce skills requirements – as defined by occupations which in turn affects the levels of training and qualification attainments to meet the industry's projected growth within each region.

This is evident through the ConstructionSkills Network (CSN) annual econometric forecasts which show the annual requirements of different construction related occupations, such as, bricklayers, managers, or roofers.. This is based on the projected growth of each sub-sector in each region. For example, CSN (2007) showed that there is an average annual requirement of 100 Civil Engineering operatives in the North East (NE) where infrastructure projects make-up 5 per cent of projects in the NE, on the other hand there is a requirement of 200 workers in the same trade in the North West (NW) where infrastructure projects make-up 9 per cent of projects in the NW. It becomes clear that skills development and training requirements are a function of the changing workload in the industry sub-sectors in each region, in addition to the wider economic context in which they operate. Indeed a change in the industry skills base may be merely a sign of the industry adapting to meet its skills needs (given its very complex structure) and thus the notion of changing skills to enhance productivity performance becomes uncertain.

Conclusion

Despite the development of the construction industry's skills base in terms of increased qualification attainments and participation levels in training, this has not translated

into concurrent improvements in productivity performance over the period (1995-2006). This brings into question the certainty with which the current UK policy on skills overemphasised the effect of skills development as the key to improving productivity performance with disregard to other factors. The modus operandi of the construction sector coupled with its fragmented employment structure affects participation rates in training as opposed to the need or drive to improve productivity performance. Moreover, the industry's productivity performance did not seem to be consistent over the past decade with the incidence of poor productivity performance superseding good productivity performance.

Therefore, there is an urgent need to consider skills development and training within the context of construction businesses in relation to other factors in order to unpack how skills can bring about improvement in productivity performance. This is fundamental if employers are to buy-in the government skills agenda. How government agencies are supposed to proactively engage with employers without having the right evidence that directly relates to them?

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Appendix 3: Paper 3

Abdel-Wahab, MS, Dainty ARJ, Ison SG, and Hazlehurst, G. (2008) An exploration of the relationship between training grants and profitability of UK construction companies, *International Journal of Training and Development (IJTD)*, **12** (3), 188-205.

An exploration of the relationship between training grants and profitability of UK construction companies

Mohamed Abdel-Wahab,
Andrew R. J. Dainty, Stephen G. Ison
and Guy Hazlehurst

A levy/grant system exists in the UK construction industry to provide financial support for companies undertaking training activities. With the current UK government skills policy, there is an emphasis on ensuring that training support provided to employers is aimed at enhancing companies' profitability. This paper explores the profitability of construction companies in relation to training grants. Inferential and descriptive statistics were used to analyze a uniquely combined dataset over the period 2002–2005. The research revealed that there is not a simple linear relationship between training grants and profitability. However, large and more profitable companies claimed more training grants in relation to the following areas of training: management, qualifying their existing workforce (certifying the skills of their existing workforce) and developing training plans. The authors argue that training grants should be targeted and focused towards specific areas of training if profitability gains are to be achievable. Future research should consider training grant utilization within the context of construction companies in order to ascertain the real contribution of training grants to their profitability.

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Introduction

UK government skills policy views workforce skill development as a key driver for economic success and for improving productivity performance (Budget Report, 2005; *Leitch Review*, 2006; Sector Skills Development Agency, 2005). It is claimed that a 5 percentage point increase in participation levels of sector-wide training is associated with a 4 per cent increase in productivity (measured by gross value added per worker) (Dearden *et al.*, 2000). Accordingly, there is a call on employers to increase their demand for skills at all levels: from senior management to those engaged in routine activities (Learning and Skills Council (LSC), 2007). It seems that the evidence presented to employers, in order to engage in skill development and training, relies on making an economic argument as opposed to a clear business case put forward to employers. Keep *et al.* (2006) argues that the concept of productivity is elusive to employers. He further states that the UK government-commissioned research literature has focused on establishing a link between investments in skills and productivity by using metrics that senior managers are unfamiliar with as it does not relate to their business context.

Despite the theoretical and intuitive appeal of investing in training and skill development, limited evidence remains that such investments will enhance company performance or profitability (Galindo-Rueda & Haskel, 2005). Furthermore, Boselie *et al.* (2005) found that the decisive proof of a link between human resource management (HRM) practices, including training and development, and company's performance remains elusive.

Given that the UK construction industry retains a levy and grant system, it presents an ideal industry for testing the validity of both employers' claims and government skills policy assumptions. The *Leitch Review*¹ (2006, p. 79) advocates having a levy/grant system as a means of encouraging employers to engage in training activities, but only if endorsed by a majority of employers in a specific sector. In construction, three-quarters of companies on the levy/grant register, which has around 60–70,000 companies, support the continuation of a statutory levy/grant system for training in the UK construction industry (ConstructionSkills, 2006).

Training grants are intended to encourage construction companies' participation in training activities, given that the construction industry is characterized by low levels of training activities. This is attributable to the employment structure of the sector, which is skewed to smaller companies (see SME Statistics, 2005). Moreover, this may be further explained by the common practice of 'poaching staff' among construction companies (Dainty *et al.*, 2005). Instead of companies investing their own resources in training, they resort to poaching staff who are already trained and experienced.

In this respect, training grants, issued through the training grant scheme and managed by the Construction Industry Training Board (CITB²), are used to encourage companies to undertake their own training through offsetting training costs. Training grants are only awarded for training activities that have taken place in a given calendar year. The more training grant is claimed, the more training activity is undertaken, by the claimant company, and vice versa. The use of the training grant as a proxy for training activity is a useful measure given the paucity of data on companies' expenditure on training (see Benson, 1996). Thus, this paper attempts to address the potential value of 'training grants' to construction companies beyond a mere increased incidence of training and/or the offset of training costs. More specifically, it explores the relationship between training grants and profitability of UK construction companies.

¹ This is an independent review, commissioned by the UK government, which was aimed at identifying the UK's optimal skills mix for 2020 to maximize economic growth, productivity and social justice.

² CITB has a statutory right to impose a levy on construction employers and to redistribute it in the form of training grants through its training grant scheme.

Evaluation of training

The evaluation of training is essential in providing a justification for undertaking further training activities in the future. There is often an espoused link between training and company performance, despite the paucity of such evidence as discussed above (see Fleetwood & Hesketh, 2006). This could be explained by the pressures on human resources (HR) departments to justify that investment in training is money well spent and potentially supports business performance (Wall & Wood, 2005).

Phillips and Phillips (2001) suggest that the evaluation of training emanates from the need to respond to executives' and managers' requests to provide a justification for the money spend on training particularly with the increased competition for scarce resources within an organization, in addition to the view that training programmes often fail to deliver their proclaimed results.

In order to evaluate training in a structured way, Kirkpatrick's (1996) framework for the evaluation of the impact of training, which is widely used in the literature, offers a useful starting point. The framework includes the following four levels: (1) reaction – how the trainees react to the training (their feelings about the structure and content of the training and the methods employed); (2) learning – the principles, facts and techniques learned by the trainees; (3) behaviour – the changes in job behaviour and performance resulting from the training or how learning at the previous level has been applied by students; and (4) results – this is a measure of the final results that occur due to training, such as increased sales, higher productivity, higher profits and less employee turnover. Phillips and Phillips (2001) extended Kirkpatrick's framework to include a fifth level that addresses the return on investment of training, and they noted that not all training activities or programmes require evaluation at all five levels. They explained that it is essential to identify the purpose of the training programme in order to inform the level at which the evaluation of training should take place.

This framework is useful in informing the level of evaluation at which 'training grants' should be undertaken. When considering the remit of CITB as a Sector Skills Council³ (SSC), which involves encouraging skill development (through training) in order to help in improving companies' productivity performance, the evaluation of 'training grants' at level four of Kirkpatrick's model becomes apparent. An evaluation at this level would potentially help in demonstrating the added value of training grants in relation to enhancing performance levels.

Training and performance

Construction employers often claim that training provides a positive contribution to their productivity performance and profitability (City and Guilds, 2006; Employer Panel Consultation, 2006; Winterbotham & Carter, 2006). Similarly, Cosh *et al.* (2003) found that half the businesses they surveyed, which included manufacturing, financial and business services companies, felt that training had increased their turnover and profit margin, and three-quarters thought that it had improved their labour productivity; moreover, Bassi and McMurrer (1998) similarly found that companies that invest more heavily in training perceived that they were more successful and profitable. Although this research presents a positive and consistent picture, there is a potential bias in the findings of this survey type of research, as companies might justify their training expenditure by claiming that it would improve their performance and enhance their profitability (Huselid, 1995).

Other research found that companies receiving training grant assistance increased their number of training hours and reduced their product scrap rate (Holzer *et al.*, 1993). Furthermore, Clements and Josiam (1995) demonstrated that the financial gains

³ SSCs, established in 2002, have a remit to provide employers with a unique forum to express the skills and productivity needs pertinent to their sector. SSCs have four key objectives: addressing skills gaps and shortages; improving performance and productivity; providing opportunities for training and development; and supporting the development of training standards and curricula.

of training outweighed the cost. They followed a framework developed by Swanson and Gradous (1990) that provides a step-by-step guidance for evaluating the financial benefits of training.

Although there is an association between HRM practices (including training) and performance, there is a failure to show that HRM causes higher performance (Guest *et al.*, 2003). It follows that the effect of HRM practices, including training, on organizational performance is plagued by methodological limitations, which make such a conclusion premature, and future progress therefore depends on using better research methods (Wall & Wood, 2005). As such, the results of previous research present a number of challenges/shortcomings which are discussed below.

First, a robust approach for the evaluation of training and performance should consider two groups of companies, those engaging in training, as opposed to those who do not, in order to properly assess the potential effect of training. Phillips (1996) argued that using control groups is one of the ways for isolating the effect of training. In this paper, the measure adopted is training grants, i.e. companies who claimed training grants as opposed to those who did not. Thus, Phillips' suggestion of using control groups was adopted in this research – as will be discussed later.

Second, the idea of reverse causality raised by Paauwe and Richardson (1997) is a critical issue when studying the link between HRM (that would include training) and performance. For example, organizations with a higher profit level might show more willingness to invest in HRM, such as training and development, than those who are constrained financially. Based on the studies cited above, it is often believed that training is a driver of performance; however, it could be the other way round that companies who are more profitable have more spare cash to spend on training, particularly because training is often regarded as an unnecessary luxury, i.e. for aesthetics purposes (see Buckley & Caple, 2004). Arguably, it makes sense if money is a constraint that businesses would rather spend it on more pressing business needs than training. Paauwe and Boselie (2005) explained that the cross-sectional nature of the majority of research on HRM and performance makes it impossible to rule out the effect of reverse causality.

Third, a key weakness in the literature is the lack of research addressing the possible time lag between HRM interventions, including training, and its effect on firm performance. Hailey *et al.* (2005) argued that only a few studies take a longitudinal perspective suggesting that the majority of HRM interventions have a time-lagged effect, sometime up to 2 or 3 years, before generating effects on firm performance.

Fourth, there is evidence to suggest that the situation with regard to the relationship between training and profitability is complicated by other factors. Participation levels of training vary by firm size, which has not been addressed in the aforementioned research studies. In essence, larger firms tend to have a more strategic and structured approach to training than small and medium firms, which focuses on their intermittent rather than their strategic training needs (Cosh *et al.*, 2003; Keogh & Stewart, 2001). Large organizations also have formalized job structures and are more unionized, in addition to operating in environments that encourage investment in training (Knoke & Kalleberg, 1994). These studies, however, fall short of considering the effect of such variation of training by firm size in relation to performance. Thus, the context of the firm and its competitive strategy is key in determining the true benefits of investment in training in relation to performance (Ashton & Sung, 2006; Keep & Mayhew, 1999). Indeed, training activities do not take place in a vacuum and should be viewed as a supporting function to business activities while recognizing that training activities vary in structure, content and impact (Grugulis, 2007).

In light of the aforementioned issues, the evidence of relationship between training and financial performance remains sketchy and does not go beyond reporting positive association between participation in training and companies' financial performance. It does not show how much profitable companies invest in training and what type of training activities they pursue.

This paper attempts therefore to address this gap while tackling some of the shortcomings of the literature by using a longitudinal dataset. With the focus of this paper

Table 1: Combined dataset – descriptive statistics

	<i>n</i>	Minimum	Maximum	Mean	SD
Turnover (£000s)	391	0.65	550,907.53	18,687.79	67,142.40
Profit (£000s)	439	-2,646.56	18,286.43	416.86	1,626.14
Number of employees	216	1	4,181	220	555
PPE (£000s)	216	-21.69	137.79	6.14	13.97
ROCE (%)	433	-902.44	928.21	57.80	136.01

Note: Figures are based on average values for 2002–2005 at 2000 prices, and negative value of profit indicates a loss.

ROCE = return on capital employed, PPE = profit per employee, SD = standard deviation.

being exclusively on the construction industry, it helps to address some of the issues relating specifically to the nature of the construction sector, such as its diverse employment structure and labour market.

Research method

The research is based on the analysis of a unique dataset that combines both company accounts available from the Financial Accounts Made Easy (FAME) database, and training grant data – available from the CITB⁴ levy/grant register. First, a brief description of the combined dataset is discussed along with some of the issues in the data in addition to the rationale behind using profitability measures in the research; second, statistical methods used in the analysis will be set out in relation to the issues identified in the literature review.

The combined dataset is the result of merging company financial data (FAME) and training grant data. This was done in order to produce information about companies' engagement in training activities through claiming grants in relation to their financial performance – over time. There were 1057 company matches between both data sources – based on a full name and postcode match criteria. The main factor affecting the number of company matches was the non-conformance of company names to a common name standard in both data sources.

When considering financial performance measures, profitability stands out as a key measure. Neely (2002) described the so-called 'pyramid of ratios' as the most powerful tool for reporting on financial measures. The apex of the pyramid of ratios, which signifies the importance of this measure, is an overall measure of profitability that divides profit by the assets used in generating that profit, namely, return on capital employed (ROCE). However, Bryan and Joyce (2007) described the sole focus of financial measures on ROCE as an old-fashioned way of assessing companies' financial performance, and called for the use of profit per employee (PPE) as a good proxy for earnings on intangibles, such as training and research and development.

Based on that rationale, PPE and ROCE were used in combination as key financial measures. Table 1 provides a summary of the data used in the research. It shows that the number of observations of variables ranged from a maximum of 439 observations for profit (loss) to a minimum number of observations of 216 for the number of employees.

The variation in the number of observations for each variable was primarily due to missing values in the FAME records, and also outliers were removed, which heavily skewed the data. Selection criteria of companies in FAME ensured that there is a

⁴ The views expressed in this paper are those of the authors and not those of the Construction Industry Training Board ('Construction Skills').

consistency in the sample of companies used in terms of having the same closing month of accounts and excluding unusual accounting periods, in addition to companies which ceased to trade.

Statistical analysis conducted in this research addressed the following issues (as discussed in the literature review): (1) differences in profitability between companies that claimed training grants as opposed to those who did not claim, (2) variation in profitability before and after claiming training grants and (3) the amount and type of training grants claimed by companies based on their profitability ranking.

First, descriptive and inferential statistics were used in order to explore the variation between two groups of companies, namely, claimants and non-claimants. An independent *t*-test was conducted – using 4-year average values of profitability measures (PPE and ROCE). The test attempted to investigate if there was any significant variation in companies' profitability between claimants and non-claimants. This approach provided a cross section of companies' profitability in relation to their grant status (cross-sectional data), i.e. the same firms are not necessarily being reported each year. Therefore, a paired *t*-test was conducted in order to examine the profitability of the same two groups of companies', claimants and non-claimants, over a 4-year period, i.e. starting in 2002 and ending in 2005. The advantage of using a paired *t*-test is to capture any statistically significant variation in profitability of the same companies over time. Second, a paired *t*-test was conducted to test the variation in companies' profitability before and after claiming a training grant.

Finally, companies were ranked by their profitability (PPE), where companies in the upper quartile, top 25 per cent, were compared to companies in the lower quartile – bottom 25 per cent. Accordingly, the amount and type of training grant claimed was examined based on this ranking, in addition to controlling for firm size.

Findings

Training grant status and profitability

The profitability of two groups of companies was explored. This included companies that did not consistently claim training grant (NC) as opposed to those who consistently claimed training grant (CC) over the period 2002–2005. Table 2 shows the descriptive statistics of these two groups of companies.

CC companies had considerably higher levels of turnover, profit and number of employees. NC companies appeared to be doing considerably better on profitability measures – PPE and ROCE – when considering the mean values. To test robustly the variation in profitability between both groups of companies, independent and paired *t*-tests were conducted.

The results in Table 3 indicate that there was a statistically significant difference in PPE between NC and CC companies, $t(110) = 2.2$, $P = 0.030$, that is, the average PPE (£000s) of NC companies ($M = 8.8$, $SD = 19.5$) was significantly different from that of CC companies ($M = 4.1$, $SD = 7.0$) (see Table 4). Moreover, the results indicate that there was a statistically significant difference in ROCE between NC and CC companies, $t(390) = 4.4$, $P = 0.000$, that is, the average ROCE (per cent) of NC companies ($M = 72.7$, $SD = 160.1$) was significantly different from that of CC companies ($M = 27.5$, $SD = 52.2$).

The results in Table 5 show that there was a statistically significant correlation between PPE in 2002 and 2005 ($r = 0.29$, $P = 0.004$). There was also a statistically significant correlation between ROCE in 2002 and 2005 ($r = 0.31$, $P = 0.001$). This indicates that these companies had already been attaining higher levels of profitability when they claimed grant in 2002.

A paired-sample *t*-test (Table 6) revealed a statistically insignificant difference in PPE (£000s) in 2002 when compared to 2005, $t(97) = -1.5$, $P = 0.14$. This indicates that the mean PPE (£000s) in 2002 ($M = 3.7$) was not significantly higher than the mean in 2005 ($M = 5.1$). It has to be noted that this variation could be regarded as statistically significant at a lower confidence level, e.g. 90 per cent. For ROCE (per cent), a paired-sample *t*-test revealed a statistically insignificant difference in 2002 when compared to 2005,

Table 2: Claiming status and financial performance

	Claiming status											
	No						Yes					
	<i>n</i>	Minimum	Mean	Median	Maximum	<i>n</i>	Minimum	Mean	Median	Maximum		
Turnover (£000s)	274	0.65	2,008.69	356.40	31,999.88	117	166.67	57,748.25	12,045.83	550,907.53		
Profit (£000s)	296	-971.64	76.42	17.48	2,284.34	143	-2,646.56	1,121.56	193.32	18,286.43		
Number of employees	93	1	31	19	298	123	11	363	100	4,181		
PPE (£000s)	93	-12.31	8.79	3.59	137.79	123	-21.69	4.14	2.71	43.83		
ROCE (%)	290	-902.44	72.73	34.53	928.21	143	-241.31	27.53	21.53	277.61		

Note: All figures are based on a 4-year average, for example: turnover = turnover in (2002 + 2003 + 2004 + 2005)/4.
 ROCE = return on capital employed, PPE = profit per employee.

Table 3: Independent sample test – companies claiming grant as opposed to not claiming

	Levene's test for equality of variances		t-Test for equality of means			
	F	Sig.	t	d.f.	Mean difference	95% Confidence interval of the difference Lower Upper
PPE (£000s)	16.22	0.000	2.446	214	4.64	0.90 8.38
			2.195	109,972	4.64	0.45 8.83
ROCE (%)	31.60	0.000	3.289	431	45.20	18.19 72.21
			4.36	390.23	45.20	24.82 65.58

ROCE = return on capital employed, PPE = profit per employee.

Table 4: Group statistics – companies claiming grant as opposed to not claiming

	Claim status	<i>n</i>	Mean	SD
PPE (£000s)	No	93	8.79	19.47
	Yes	123	4.14	6.98
ROCE (%)	No	290	72.73	160.11
	Yes	143	27.53	52.24

SD = standard deviation, ROCE = return on capital employed, PPE = profit per employee.

Table 5: Paired-sample statistics and correlations – companies that claimed training grant consistently

		<i>n</i>	Mean	SD	Standard error of the mean	Correlation	Sig.
Pair 1	PPE02 (£000s)	98	3.66	4.47	0.45	0.29	0.004
	PPE05 (£000s)	98	5.13	10.10	1.02		
Pair 2	ROCE02 (%)	110	28.29	85.97	8.20	0.31	0.001
	ROCE05 (%)	110	33.12	53.75	5.12		

SD = standard deviation.

Table 6: Paired-sample test – companies that claimed training grant consistently

		Paired differences				<i>t</i>	d.f.	Sig. (two tailed)
		Mean	Standard error of the mean	95% Confidence interval of the difference				
				Lower	Upper			
Pair 1	PPE02–PPE05 (£000s)	–1.46	0.99	–3.43	0.50	–1.48	97	0.143
Pair 2	ROCE02–ROCE05 (%)	–4.83	8.21	–21.11	11.44	–0.59	109	0.557

$t(109) = -0.60$, $P = 0.56$. This indicates that the mean ROCE in 2002 ($M = 28.3$) was not significantly higher than the mean in 2005 ($M = 33.1$). It can be concluded from this test that despite the improvement in CC companies' profitability, this variation is not statistically robust enough as it is below the 95 per cent confidence level.

The results in Table 7 show that there was a statistically insignificant correlation between PPE (£000s) in 2002 and 2005 ($r = 0.25$, $P = 0.08$). However, there was a statistically significant correlation between ROCE in 2002 and 2005 ($r = 0.34$, $P = 0.000$). This indicates that NC companies had already been attaining lower levels of PPE as opposed to higher levels of ROCE.

A paired-sample *t*-test (Table 8) revealed a statistically insignificant difference in PPE (£000s) in 2002 when compared to 2005, $t(49) = 0.97$, $P = 0.34$. This indicates that the mean PPE in 2005 ($M = 12.1$) was not significantly lower than the mean in 2002 ($M = 16.8$). For ROCE (per cent), a paired-sample *t*-test revealed a statistically insignificant difference in 2002 when compared to 2005, $t(129) = 1.1$, $P = 0.29$. This indicates that

Table 7: Paired-sample statistics and correlations – companies not claiming training grant consistently

		<i>n</i>	Mean	SD	Standard error of the mean	Correlation	Sig.
Pair 1	PPE02 (£000s)	50	16.8043	28.90	4.09	0.25	0.079
	PPE05 (£000s)	50	12.0594	27.54	3.89		
Pair 2	ROCE02 (%)	130	44.8784	94.89	8.32	0.34	0.000
	ROCE05 (%)	130	34.6537	96.21	8.44		

SD = standard deviation.

Table 8: Paired-sample test – companies not claiming training grant consistently

		Paired differences					<i>t</i>	d.f.	Sig. (two tailed)
		Mean	SD	Standard error of the mean	95% Confidence interval of the difference				
					Lower	Upper			
Pair 1	PPE02–PPE05 (£000s)	4.74	34.56	4.89	–5.08	14.57	0.97	49.00	0.336
Pair 2	ROCE02–ROCE05 (%)	10.22	110.02	9.65	–8.87	29.32	1.06	129.00	0.291

SD = standard deviation.

Table 9: Paired-sample statistics and correlations – companies not claiming training grant then claimed

		<i>n</i>	Mean	SD	Standard error of the mean	Correlation	Sig.
Pair 1	PPE02 (£000s)	22	5.09	75.34	16.06	0.89	0.000
	PPE03 (£000s)	22	7.05	102.23	21.80		
Pair 2	PPE02 (£000s)	20	5.17	78.54	17.56	0.52	0.018
	PPE04 (£000s)	20	7.08	115.64	25.86		

SD = standard deviation.

the mean ROCE in 2005 ($M = 34.7$) was not significantly lower than the mean in 2002 ($M = 44.9$). It can be concluded from this test that despite the drop in profitability of NC companies, this variation was not statistically significant.

Variation in profitability before and after claiming training grant

Considering companies which did not claim grant in 2002 and then claimed in 2003, it appears that there was an increase/improvement in their profitability – ROCE (per cent) increased from 34 per cent in 2002 to 38 per cent in 2003. There was a significant positive correlation between the ROCE in 2002 and 2003 ($r = 0.66$, $P = 0.000$), indicating that those companies who had high ROCE before claiming grant also tended to have high ROCE after claiming grant. Moreover, PPE (£000s) increased from 5.09 in 2002 to 7.05 in 2003 (see Table 9).

Table 10: Paired-sample test – companies not claiming training grant in 2002 then claimed in 2003 and 2004

		Paired differences				<i>t</i>	d.f.	Sig. (two tailed)	
		Mean	SD	Standard error of the mean	95% Confidence				
					Lower				Upper
Pair 1	PPE02–PPE03 (£000s)	-19.55	49.77	10.61	-41.61	0.00	-0.018	21	0.080
Pair 2	PPE02–PPE04 (£000s)	-19.10	100.14	22.39	-65.97	27.77	-8.5E-06	19	0.404

SD = standard deviation.

A paired-sample *t*-test revealed a statistically insignificant difference in ROCE (per cent) in 2002 when compared to 2003, $t(38) = -0.610$, $P = 0.55$. This indicates that the mean ROCE in 2003 ($M = 45$) was not significantly higher than the mean in 2002 ($M = 38$). It can be concluded that after claiming training grant, companies' improvement in profitability, measured by their PPE, was more significant than when measured by ROCE.

When considering the variation of profitability after 2 years, i.e. to account for the time lag of the effect of training (see Haiely *et al.*, 2005), it appeared that there was no variation in profitability when considering the PPE02–PPE03 as opposed to PPE02–PPE04. It may seem that training may have already had its effect in 2003, and no significant effect was captured a year later (Table 10), i.e. in 2004 ($P = 0.080$).

This presents evidence that the variation in profitability in relation to training might be dependent on the amount and type of training activity, which will be explored in the following section.

Amount/type of training grant and profitability

This section only considers companies that have been consistently claiming training grant each year, over the period 2002–2005, in order to examine if there is a variation in their profitability with respect to the amount and type of grant they claimed. Training grant refers to the amount of money claimed for training activities already undertaken by a company during a calendar year – as mentioned above. Training grants comprise the following areas of training: new entrants, adult craft, plant, management/technical, qualifying the workforce and developing training plans.

Testing for correlation, in terms of the amount of grant with respect to turnover, profit and number of employees, the following results were found, namely, strong correlation between grant and turnover ($r = 0.727$, $P = 0.000$), moderate correlation between grant and profit ($r = 0.297$, $P = 0.000$), and strong correlation between grant and number of employees ($r = 0.708$, $P = 0.000$).

If companies' size is defined by turnover, profit and number of employees, then this suggests that larger companies have a tendency to claim more training grant. It follows that the profitability of these companies in relation to both the amount and type of training grant is further explored in the next section.

PPE and training grant

Companies were ranked on the basis of their PPE level. Below are summary descriptive statistics of the sample of companies that have been consistently claiming training grant over the period 2002–2005 (Table 11).

It appears that companies with higher levels of PPE claimed a slightly higher proportion of training grant than companies with a lower PPE – 51 per cent and 49 per

Table 11: Profitability distribution of companies claiming grant

	Valid <i>n</i>	Mean	Percentile 25	Median	Percentile 75
PPE (£000s)	124	4.77	1.12	2.76	4.81

Note: Profit per employee (PPE) is based on average values of 2002–2005. It is calculated at 2000 constant prices.

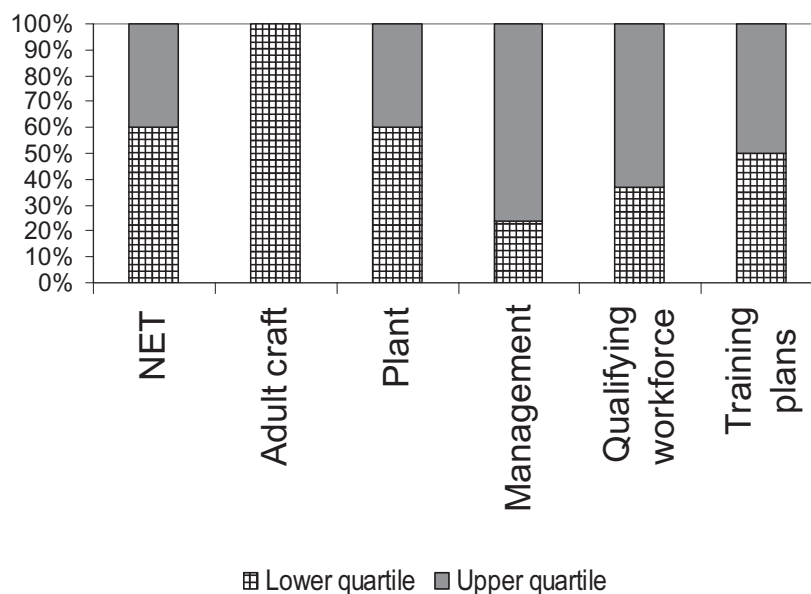


Figure 1: Distribution of training grant by type and by rank of profit per employee.

Note: Figures are based on the total amount of training grants claimed for each specific grant type in 2005. Description of 'training grant' types or categories: NET: refers to training grants that involve new entrant training activities, such as training apprentices. Adult craft: training grant supporting craft training of new entrant adults as well as existing workers. Plant: training grants for training plant operatives to get a formally recognized qualification. Management: training grants relating to management training, such as site management and safety training course. Qualifying workforce: training grants aimed at certifying the skills of the existing workforce, which includes schemes, such as on-site assessment and training. Training plans: training grant claimed towards developing a company training plan.

cent, respectively. Moreover, they had considerably higher levels of ROCE (35 per cent) than companies with lower PPE (8 per cent). When considering the effect of training grants on companies' profitability, the type of training grant should be considered as opposed to merely looking at the quantity of training grants. The different types of training grants are considered next.

Figure 1 shows that companies with a higher PPE appeared to be claiming more training grants in the following areas: management training, qualifying workforce and training plans. However, companies with lower PPE appeared to be claiming higher training grants in the following areas: new entrant training (NET), adult craft and plant.

Variation by firm size

Figure 2 shows that large companies with higher PPE appeared to be claiming more training grant, whereas medium and small companies with higher PPE appeared to claim lower amounts of training grant. This does not show a straightforward linear

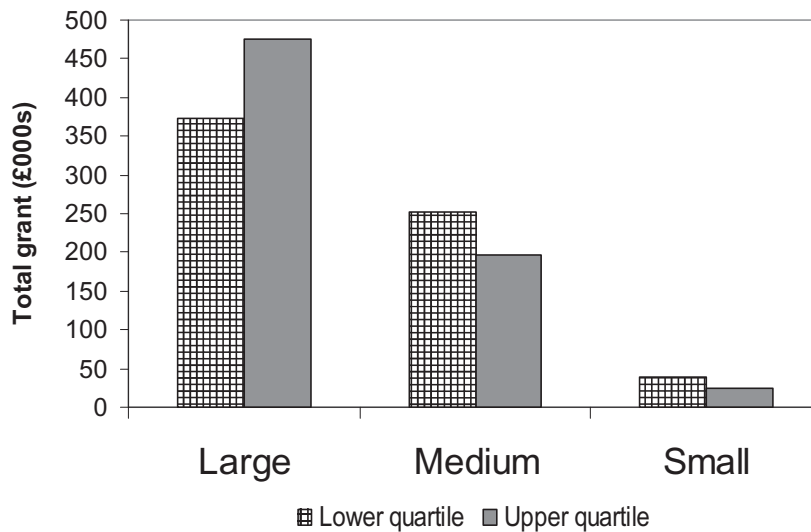


Figure 2: Total grant by firm size and by rank of profit per employee.

Note: Firm size is classified based on the number of employees working in each company: 10–49, small; 50–249, medium; and 250+, large.

relationship between investment in training (through training grants) and profitability. Larger firms appeared to be claiming higher amounts of training grant when compared with medium and smaller companies. A breakdown of training grant types for large companies is considered next.

Figure 3 shows that large firms with higher PPE claimed more training grant than those with lower PPE in all areas except for adult craft. The main types of training grants for large and more profitable firms comprise management, NET and qualifying the workforce. By contrast, medium-sized firms with higher PPE claimed more grant in plant and qualifying the workforce, whereas companies with lower PPE claimed more grant towards NET. However, none claimed training grant towards adult craft training.

Discussion

Grant status and profitability

The relationship between training grants and profitability is a complex one. This is inconsistent with the body of literature that suggests a positive correlation between engagement in training and financial performance (e.g. Bassi & McMurrer, 1998; Huselid, 1995).

CC companies' attainment of lower profitability levels than NC companies (see Tables 3 and 5–7) suggests that training grants may not be directed to specific training that would bring about an improvement in profitability. This brings into question whether or not the training within these companies is driven by their business strategy. This is consistent with Ashton and Sung (2006), who argue that more training activity is not necessarily linked to improved performance – as it is a question of company's competitive strategy.

However, the slight improvement in profitability for CC companies (Tables 5 and 6) is consistent with the notion that training enhances profitability. Attainment of profitability improvement through investment in training is achievable as presented in a case study of a manufacturing company who invested in training through the Employer Training Investment Program – a scheme adopted in the USA by the Department of

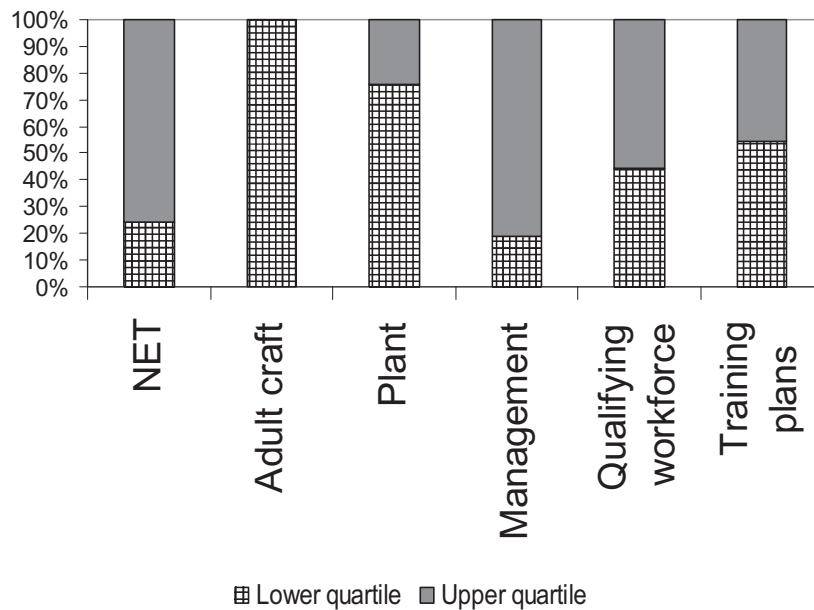


Figure 3: Distribution of training grant type by rank of profit per employee – large firms. NET = new entrant training.

Commerce and Economics. This company used training grants to implement a new software system with a view to increase its production by 75 per cent as well as its profitability levels (Blagojevich, 2004). It can be similarly argued that significant improvements in profitability are not attainable due to not investing enough in the right type of training that would bring about significant enhancement to profitability.

Furthermore, significant changes in profitability of CC companies may not have been observed due to lack of information on which area of training companies were engaged in. Clearly, this presents a complex picture of training as it is not necessarily a remedy to companies' performance problems. Training could offer a good viable solution if it aligns with the business competitive strategy and there is a clear need for it. Moreover, if the benefit outweighs the cost, by following a framework similar to Swanson and Gradous (1990), then undoubtedly it would present compelling evidence for a business to pursue training activities.

Considering the issue of time-lag effect of training (see Tables 9 and 10), it appeared that if training would have had an effect on profitability, it could have been experienced in the same year when training was undertaken. Two years after the training was undertaken might not necessarily be the definitive timescale for training effect to show on a company's performance, which is in contrast with Haiely *et al.* (2005), who claimed that the time-lagged effect of training could sometimes be up to 2 or 3 years. The bottom line is the type of training activity undertaken which would render itself relevant to performance and/or profitability.

Indeed, training activity needs to be targeted and focused on a specific business need in order for profitability gains to materialize. This claim is supported by the analysis in this paper which focused on the amount and type of grant in relation to profitability, which will be discussed in the following section.

Amount/type of training grant and profitability

Companies with higher profitability, measured by PPE, claimed more training grants (particularly large firms), which is an indication of the increased intensity of training

activities. This could be explained by the tendency of large firms to have a more strategic and structured approach to training particularly in management and to enhancing/further development of their workforce compared with small and medium firms (Cosh *et al.*, 2003).

This could also be explained by ConstructionSkills' (2006) *Annual Report* that larger firms operate a managing agency for the construction industry training centres and therefore had access to higher levels of NET grants. The top three areas of claiming training grant by more profitable companies included management, training plans and qualifying the workforce. Higher spend on management training results in improved management practice, which is consistent with Bloom *et al.* (2005), who found evidence that improved management practice was strongly correlated with profitability (ROCE).

Cosh *et al.* (2003) also found that companies that spent more on training engaged in more training activity and were likely to have a written training plan. However, their results did not show that higher spending on training is related to higher performance, and also, it was based on the perception of employers as opposed to the actual facts and figures. As such, the findings suggest that companies with higher profitability tend to consider having a structured approach to training activities through having a training plan. It has to be noted though that having a training plan does not necessarily mean that it is being implemented successfully to serve the business needs.

The variation in the amount of grant claimed and profitability is more noticeable for larger firms than smaller- and medium-sized firms (see Figure 3). Large companies with higher profitability claimed higher amounts of training grants. This confirms the findings of Paauwe and Richardson (1997) that more profitable companies would tend to spend on training because they can afford it as opposed to training being a driver for higher profitability. With large companies only making up a small proportion of employment within the construction industry, there is an opportunity for fostering working arrangements, such as partnering, in the construction industry in order to promote training culture – where smaller companies make use of the training resources of larger companies, e.g. training centres.

It has to be noted that training grant, claimed by companies in various areas, could only serve as an indicator of the companies' training activities, as companies may have their own resources or HR budget for funding their companies' training activities. In that context, training grant should only be viewed as one component of training support. Arguably, claiming a specific amount/type of grant is a reflection of its priority/commitment to training in specific areas while minimizing the effect of reverse causality – where training cost is not an issue because training is paid for through the grant system.

Possible implications for skills policy

If companies are already doing well in terms of their profitability, it becomes difficult to build the case for training to employers on the grounds of enhancing their profitability. There is a need therefore to ensure consistency and clarity of the messages conveyed to employers within the context of government skills policy.

This idea becomes particularly clear when juxtaposing two of the key messages of the LSC (2007): (1) employers to raise the demand for skills at all levels: from senior management, responsible for the strategic vision of the organization, to those engaged in more routine day-to-day activities; and (2) skills cannot be considered in isolation and should be placed at the heart of an organization's business plan. It raises an immediate question with respect to a company that is already performing well and meeting its training requirements for getting on with the job – do they need to raise the demand for skills unnecessarily?

This becomes a particularly risky endeavour given the resource implication to the business and potential disruption to their activity; therefore, it is not always useful to

'exhort all employers to train more' (Ashton & Sung, 2006). The notion of training as unquestionably positive for business remains a recurring message in the government skills policy (see Budget Report, 2005; *Leitch Review*, 2006). Expectation and commitment from employers through pledges, as advocated by the *Leitch Review* (2006), where training is geared towards meeting targets and achieving a minimum qualification level, could be questioned on the basis of these findings. These efforts may have little relevance to business performance and profitability because performance-driven training efforts entail linking such training activities to a business strategy, i.e. training does not take place in vacuum.

Creating the need for training may require companies to redefine or alter the way they are doing their work for profitability or performance gains to materialize. For example, companies might consider training in using new technology or equipment if it improves its performance or the level of service it provides to its customers. As such, there is a need to have a more structured approach for quantifying the real financial benefits of training within the context of construction businesses drawing on models developed in the literature, such as Swanson and Gradous (1990).

Although training grants are a useful resource for UK construction companies, there is a need to ensure that they are focused upon and targeted towards specific areas of training in order to bring about potential improvement in profitability. The evaluation and quantification of the true effect of training is the responsibility of companies. They will need to try to isolate the effect of training by adopting methods such as trend-line analysis (Phillips, 1996). Phillips explained that this approach entails drawing a line from current performance to future performance, assuming that the current trend will continue even without training. After employees receive training, their post-training performance is compared to their performance predicted on the trend line. Although this method should not be regarded as an exact process, it provides an indication of the effect of training.

Conclusions

This paper is an attempt to provide prima facie evidence of how 'training grants' and 'profitability' are related, and it was found that there is no clear and straightforward linear relationship between the two variables. This demonstrates the multiplicity of influences on profitability, and that a simple claim about the mono-causality of training and profitability is unhelpful. The interpretation of the relationship between training and profitability therefore should be treated with caution, and there should be a clear acknowledgement in skills policy documents to the complex nature of such a relationship.

Construction companies, however, need to make best use of the opportunity presented through training grants in order to use it as a vehicle for attaining potential profitability improvements. Moreover, it might be useful to consider having a training grant that is specifically focused and targeted at profitability improvements. However, it should be required from firms to demonstrate the effect of such training on their performance.

Exploring patterns in company-level data, as discussed in this paper, should only be regarded as a first step towards unravelling the true effect of training interventions. Future research therefore should adopt a more qualitative approach, such as case studies, to examine the potential contribution of training to profitability within the context of construction companies. This should also consider the means by which a company addresses its skills and training needs.

If a business adopted a structured approach to training, by developing a training plan (and by making use of training grants), this can ensure that its training activities are carefully aligned with its business strategic needs. Indeed, this would provide an in-depth understanding of the true effect of training grants on profitability and would make the impact of the training grant scheme more noticeable.

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Appendix 4: Paper 4

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The participation of Small-to-Medium Enterprises in skills and training initiatives in the UK construction industry: implications for skills policy and construction companies

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ABSTRACT

The UK construction industry faces an on-going challenge of addressing its skills shortages. This paper examines employer participation in skills and training initiatives in light of the current UK government skills policy. A major telephone survey of 1,200 small to medium sized enterprises (SMEs) revealed that the participation in skills and training initiatives was focused more on qualifying their existing workforce (i.e. the formal recognition/certification of existing operative skills) rather than on taking on new entrants or enhancing management competence. The main reasons for this were seen to be the need to comply with client contract requirements rather than a desire to enhance performance and/or productivity. However, SMEs regard new entrant training as an area of high priority in the future given their concerns over capacity constraints within the sector. The results have significant implications for government skills policy given its espoused 'demand-led' ethos and promotion of skills/training as a vehicle for attaining performance and/or productivity improvements.

KEYWORDS: initiatives, policy, SMEs, skills, training, performance

INTRODUCTION

The UK construction industry faces recurrent difficulties in meeting its skills and labour requirements. Recent forecasts show that the construction industry's output is projected to increase by 10.8% by 2011, which is equivalent to an average annual growth rate of 2.7% (CSN, 2007). If this materializes it will mean almost 20 years of growth by 2011 which will put considerable pressure on the capacity of the industry's labour market. Whilst the influx of migrant labour following EU Accession has done much to offset immediate skills concerns (Paul, 2006; REC, 2007), there remains a need to attract enough new entrants to provide a sustainable inflow of workers for the future. Results of the recent Construction Industry Trade Survey (2008) indicate that firms continue to turn down work and experience delays on projects due to labour shortages across various construction trades such as steel benders and fixers; plasterers, carpenters and joiners. A failure to address skills shortages, along with the skills gaps of the existing workforce, has the potential to impede the industry's performance (Bloom et al., 2004), as well as leading to inflationary pressures in relation to construction costs (see Briscoe and Hogarth, 2008).

The UK construction industry is traditionally characterised by low participation levels in training when compared to other industries (See Dearden et al., 2000; Morton, 2002) and SMEs (defined as companies employing less than 250 workers) in particular are characterised as having a lower propensity to train when compared to larger companies (See LFS, 2005; Smith and Hayton, 1999). Given that such firms account for 83% of employment within the construction industry and produce around 68% of the sector's output (Small Business Unit, 2006), then low levels of participation in training are likely to act as a serious impediment to the future growth and development of the sector. Accordingly, this paper aims to examine the participation of SMEs in skills and training initiatives and the factors which shape such participation. By relating such tendencies against current skills policy, the aim is to identify the extent to which the current government skills policy is likely to address skills concerns in the future.

Skills and training initiatives for the UK construction sector

Skills and training initiatives can be classified into three broad (although by no means extensive) categories: New Entrant Training (NET), Qualifying the workforce (i.e. certifying the skills and competencies of the existing workforce) and management training (see Table 1) – which are subsequently discussed (ConstructionSkills, 2005).

The aim of NET schemes is to attract new entrants to the construction industry which could potentially alleviate the problem of skills shortages. Traditional apprenticeship schemes involve apprentices studying at Further Education (FE) colleges and having a work placement at the same time. A key challenge for an apprentice is to find an employer who is willing to provide them with the necessary work experience in order to complete their apprenticeship successfully. Programme Led Apprenticeships (PLAs) however were developed to provide an alternative route for completing an apprenticeship. Apprentices going through PLAs would already have completed the taught element of

Table 1 Classification of skills/training initiatives
(source: ConstructionSkills 2005)

Scope of skills and training initiatives	Initiative
1. New Entrants Training (NET)	<ul style="list-style-type: none"> • Traditional apprenticeships; • Programme-Led Apprenticeships (PLAs); • INSPIRE scholarships.
2. Qualifying the existing workforce	<ul style="list-style-type: none"> • Construction Skills Certification Scheme (CSCS); • On-Site Assessment and Training (OSAT); • Experienced Worker Practical Assessment (EWPA).
3. Management	<ul style="list-style-type: none"> • Site Management Safety Training Scheme (SMSTS).

their apprenticeships as they would have passed an intermediate construction award (ICA) – which is believed to be an indication of their commitment to pursuing a career in the industry. The idea is currently to encourage and attract more employers to participate in apprenticeship schemes. As for INSPIRE scholarships, it is a joint funding arrangement between ConstructionSkills (Sector Skills Council for construction) and construction companies. It involves sponsoring a student through their university studies where they would have a 6-week work placement with their sponsoring company. The scheme provides participating companies with a recruiting source for new entrants whilst supporting students to pay their tuition fees.

Qualifying the workforce schemes enable employers to distinguish between workers based on their levels of competence, which would help in maintaining the standards of workforce skills particularly in relation to health and safety. At the same time, they provide an indication to clients that the industry is conforming to a common standard of workforce competence. CSCS provides a voluntary register of the skills, competence and qualifications of individual workers within the industry. OSAT and EWPA are aimed at experienced workers who do not possess formal qualification. The former involves assessing the skills of the existing workforce against relevant qualifications standards and accordingly skills gaps along with the training required are identified. The latter only provides an assessment to workers skills to ensure that they have the required competences to be awarded a qualification.

The Site Management Safety Training Scheme (SMSTS) helps site managers to develop a better understanding of the legal, moral and social responsibilities of their role, and to manage health and safety on site in accordance with current legal provisions. Thus, it ensures that managers are able to maintain adequate health and safety standards on-site. It helps managers to: demonstrate their skills to contractors and clients; run a safer and more efficient site; identify and avoid potential hazards on site; prepare method statements, risk assessments and other statutory requirements of the Health and Safety at Work Act (SMSTS, 2006).

SME participation in Skills and Training Initiatives

As was mentioned above, SMEs account for the vast majority of employment and output within the sector (Langford and Male, 2001; Male and Stocks, 1991). The importance of SMEs training is evident through the CITB training grant scheme which helps smaller companies to offset their training costs (CITB, 2003). Indeed, the chairman of the CITB has made it a policy goal to outreach to small and medium-sized companies (CITB, 2002). In that context, it can be argued that the success of skills and training schemes is almost entirely predicted on SMEs participation in them.

SMEs take up of NET schemes, such as apprenticeship, is affected by the stability in the industry's workload (Hogarth and Hasluck, 2003; Ball and Freeland, 2000). Given the uncertainties surrounding the consistency of growth in future sectoral output, this may impinge on

participation levels in NET schemes. It follows that some companies may choose not to participate in apprenticeship as a rational response to their current market position (Holden, 2007). This should not mean that SMEs disregard such schemes but it requires taking into consideration that an adequate understanding of training provision in small enterprises must acknowledge that the incidence of training, and in that case skills and training initiatives, is highly variable in terms of quantity, quality and purpose (Kitching and Blackburn, 2002).

Other issues relating to skills and training initiatives involve uncertainty around its value and relevance. For example, Dainty et al. (2005) found that whilst CSCS and OSAT schemes are intuitively appealing amongst SMEs, their value as a mechanism for upskilling remained questionable. Kitching and Blackburn (2000) also found that smaller companies questioned the relevance of government training initiatives to employer's training needs, as well as the lack of information about the nature of such schemes and their potential benefits to employers.

Despite the issues associated with take up of skills and training initiatives, as mentioned above, it is important to establish the current participation levels of SMEs in the range of initiatives outlined above along with their future training priorities. The aim is to examine how well aligned government skills policy is with the needs of construction SMEs and the extent to which the demand-led ethos meets the requirements of smaller firms operating within the sector. In order to understand the alignment of those initiatives with skills policy, this requires a brief discussion of such policy, which is discussed next.

GOVERNMENT SKILLS POLICY

In recent years government skills policy has taken a distinct turn towards responding to employer need rather than being driven by supply-side capability (DfES, 2003, DfES, 2005;). This demand-driven policy has also emphasised the need to improve productivity through upskilling the workforce. This reflects the view that skills development and training are key drivers for economic success (Budget Report, 2005; Sector Skills Development Agency, 2005; Leitch Review, 2006). Indeed, it is claimed that a 5% increase in participation levels of sector-wide training is associated with a 4% increase in productivity (Dearden et al., 2000).

A 'demand-led' approach is predicated upon the promotion of active employer involvement across various sectors of the economy in order to ensure that skills and training provision are driven by business requirements (Leitch Review, 2006; DfES, 2005). In order to implement this policy the Sector Skills Councils (SSCs) were established in 2002. They provide a vehicle, i.e. a sectoral approach, for capturing and representing the voice of employers across different sectors of the economy, with ConstructionSkills acting as the SSC for the construction industry. SSCs have a remit to provide employers with a unique forum to express the skills and productivity needs that are pertinent to their sector (SSDA, 2005).

Accordingly, the initiatives shown in Table 1 above were designed to support and promote training/skills activities within the construction industry. Most recently the government-initiated Leitch Review (2006) took this policy a stage further by recommending that government funding support should be allocated or attached to only those qualifications that are endorsed by employers. This provides evidence of the growing role likely to be played by employers in shaping future skills policy.

RESEARCH METHOD

In order to establish the participation levels of SMEs in the aforementioned skills and training initiatives (see Table 1 above) along with the underlying drivers for participating in those initiatives,

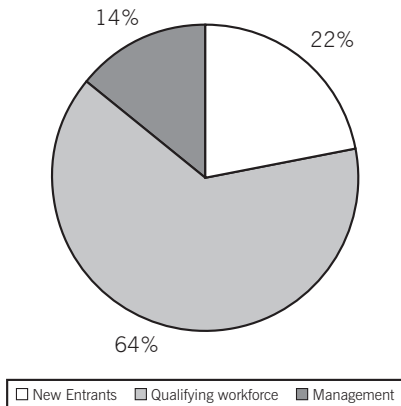
a telephone survey of approximately 1,200 SMEs was undertaken. An advantage of using a telephone surveys is that interviewers can elicit more complete and substantive answers from respondents as well as allow for clarification and elaboration concerning responses. Companies were asked about whether or not they have participated in any form of formal or informal training activity, and then specific reference was made to skills and training initiatives along with probing the underlying drivers for participating in those initiatives.

The sample of companies was drawn from the ConstructionSkills grant and levy register, which covers companies falling within the definition of the Standard Industrial Classification of the construction industry (SIC45). The data was weighted to reflect the regional distribution of the SME population as per the Annual Business Inquiry (ABI) survey – which is published by the Office of National Statistics (ONS). Thus, the sample represented a stratified sample from across the UK.

SME participation in skills and training initiatives

When companies were asked whether they have undertaken any form of formal or informal type of training activity, it was found that out of nearly 1,200 SMEs approximately 60% (n = 683) has undertaken some form of training activity. Out of those companies, who acknowledged that they trained, 71% (n = 485) has specifically participated in skills and training initiatives. Figure 1 below shows the participation levels of SMEs in skills/training initiatives – aggregated by broad area of skills/training according to ConstructionSkills classification.

Figure 1 Skills and training initiatives by-broad category (see Table 1 on previous page)

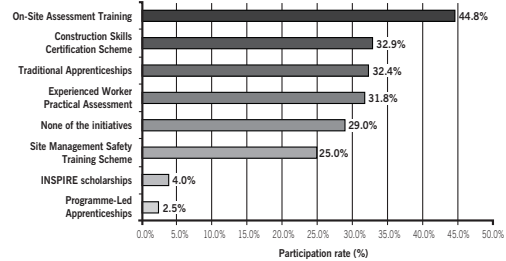


It appeared that SMEs primarily participated in initiatives relating to qualifying the existing workforce and training of new entrants, whereas SMSTS (management training) was the lowest.

Figure 2 shows that qualifying the existing workforce initiatives (OSAT and CSCS) had higher take-up than NET, namely traditional apprenticeships. Whilst 29% did not participate in any initiatives yet they have undertaken some other form of informal or formal training activity, such as in-house training. This shows that companies' training activities are not necessarily restricted to government sponsored/ supported initiatives and companies may choose to undertake their own training activities. As discussed above, smaller companies may have their own formal training arrangements, such as in-house courses, in addition to informal on-the-job training activities.

The most significant drivers affecting companies' decision to participate in skills and training initiatives are highlighted in Table 2 below. It appears that 'meeting future skills needs/shortages' is the top driver for

Figure 2 Participation rate in construction-specific skills and training initiatives

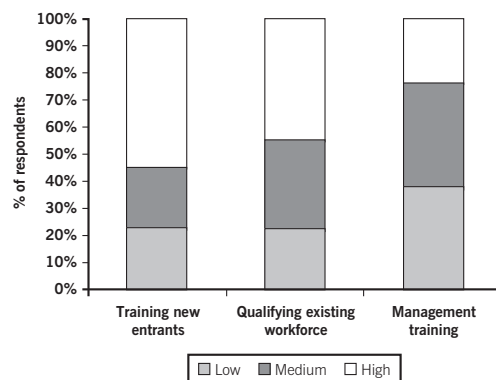


companies participating in Apprenticeship; OSAT; and EWPA schemes. On the other hand, client and/or contract requirements were the top driver for participating in CSCS. It should be noted that drivers such as 'availability of training grants' or 'improving productivity and/or performance' were not reported amongst the top drivers, which are commonly used within the skills policy arena to persuade employers to participate in training.

As for the drivers for participating in traditional apprenticeships, the quality and relevance of training provision was paramount, nonetheless there were other unique and important factors affecting the participation in the scheme. This is evidenced by the 17% of SMEs reporting company tradition as a key driver. Moreover, the type of work a company is undertaking can accommodate for taking on apprentices (11.8%) and finally it may simply be regarded as a good thing to do which enhances the business image and could help in attracting new clients (3.82%).

When SMEs were asked about the future priority of their skills and training activities, they regarded 'training new entrants' and 'qualifying existing workforce' as more important than management training (see Figure 3 below). This shows that SMEs will continue on the same path when it comes to training/skills initiatives with a potential for further participation in new entrants schemes (see Figure 1 above). This is also consistent with the current concerns of SMEs for addressing skills needs/shortages as well as compliance with client requirements when it comes to their participation in skills/training initiatives (see Table 2).

Figure 3 Priority of skills and training initiatives in the future



SMEs participation in skills and training initiatives

OSAT was found to be the most popular scheme which was mainly driven by the need to address skills needs/shortages and meet the industry standards of having a qualified workforce. Both OSAT and

Table 2 Drivers for participating in construction-specific skills and training initiatives*

	% of companies reporting each driver within each initiative			
	OSAT	CSCS	Traditional Apprenticeship	EWPA
Company policy (training plan)	6.23	6.84	11.07	-
Availability of training grants	8.10	6.46	2.29	7.11
Improve productivity and/or performance	9.03	-	-	11.85
Client and/or contract requirements	13.40	33.84	2.29	12.32
Relevance and/or quality of training provision	15.26	5.32	24.05	9.00
To meet industry standards, e.g. health and safety	19.00	30.80	2.67	12.32
To meet future skill needs/shortages	20.56	10.65	20.23	28.44
Type of work can accommodate for taking on apprentices	-	-	11.83	-
Maintenance and updating of workforce skills	4.98	-	-	14.22
Company tradition	-	-	17.18	-
Good thing to do	-	-	3.82	-
Other	-	4.18	3.05	-
Don't know	3.43	1.90	1.53	4.74

* Note that companies can participate in more than one initiative.

EWPA appeared attractive options for companies as they recognise the skills of the existing workforce and ultimately provide a route to the award of a CSCS card. For example, EWPA is a one-day assessment which is seen as a quick and convenient route for formally certifying the skills of experienced workers.

This is particularly relevant for companies who are concerned about time constraints for participating in skills initiatives. At the same time, EWPA could be a means for identifying the need for workers to update and/or maintain their existing skills (see Table 2). CSCS is predominantly driven by client/contract requirements; in addition to industry requirements (particularly H&S) (see Table 2). The widespread participation in CSCS schemes is consistent with the results of Mackenzie et al. (2000) who found that CSCS was popular amongst employers.

It has to be noted that SMEs are not viewing enhancing performance and productivity as an important driver for participating in those initiatives. Rather, they are more concerned about using it as a means of winning contracts and attracting new clients, i.e. meeting skills certification needs. Increased employer participation in CSCS is set to continue given the aspiration of having a fully qualified workforce by 2010 (ConstructionSkills, 2005). UK government, as one of the biggest clients in the construction industry, in addition to other major clients set a requirement for all workers working on its projects to have a CSCS card – which explains the popularity of the programme.

Whilst the results of this paper provide an indication of SMEs participation in apprenticeship schemes, which is consistent with Hogarth and Hasluck (2003), it appears that it is not sufficient for meeting the industry's skills needs. This becomes evident when considering that the industry continues to experience severe difficulties in recruiting site trades (see Construction Industry Trade Survey, 2008). The results (see Table 2) provide insights into what might affect employers' decision to participate in apprenticeship schemes. Availability of grants appeared as a minor factor, which shows that monetary incentives may not be the key to encouraging employers to take on an apprentice, as opposed to the quality of training provision which was perceived as more important. This is an indication that the apprenticeship framework, governing the award of an apprenticeship, should be aligned with employers' needs. ConstructionSkills efforts in that area are clear through its Construction Qualification Strategy (CQS) which is an attempt to align qualifications with employers' requirements (See ConstructionSkills, 2007).

Moreover, company tradition and having a training plan are important drivers for taking on an apprentice, which is consistent with the findings

of Ball and Freeland (2000). Thus, the promotion of apprenticeship schemes on the sole basis of monetary incentives is unlikely to be effective. The results show that taking on apprentices may emanate from the companies internal planning for training - which suggests a structured approach for determining future skills requirements. As such, companies should be encouraged to consider taking-up a training plan which might mean that the opportunities for an apprenticeship might become more visible for companies. At the same time, promoting apprenticeships on the basis of investing for the future of the business, given the state of the ageing workforce in the construction

industry might be something to consider – especially for small/family businesses to ensure future continuity and survival of their business. This requires marketing campaigns that are focused on directing these messages in order to change attitudes towards apprenticeships.

Furthermore, the promotion of apprenticeship schemes on the premise of enhancing a company's performance may not resonate with employers due to the associated overall cost to the business. The costs associated with apprentice training are not only limited to direct costs but also to the time of supervisors in training and the impediment that it has on productivity (see Fellows et al., 2002; Hogarth and Hasluck, 2003). As such, it requires the commitment from employers to invest both time and money in recruiting and training new entrants. Understandably, employers may be reluctant to pursue such an investment due to the wider spread practice of 'poaching staff' in the construction industry. Clearly, if the target of the Leitch Review (2006) of doubling the number of apprenticeships by 2011 is to be achieved, then the drivers discussed above should be carefully considered. The Apprenticeship taskforce that has been formed by the UK government to pursue this target needs to consider the range of factors affecting employers' decision to participate in apprenticeship schemes (ConstructionSkills, 2007).

Possible implications for skills policy and construction companies

Government skills policy is currently fixated on the argument that companies should participate in training and skills development activities in order to enhance both their performance and/or productivity (Leitch Review, 2006; SEDA, 2005). The findings in this paper however indicate that enhancing productivity and/or performance as a driver for participating in the aforementioned skills/training initiatives was not of a high order of importance (see Table 2). This could be understandable from an SME perspective since they are more concerned about addressing their short-term/immediate skills needs as opposed to their long-term business strategy. Training-based performance gains may require businesses to pursue product or process innovation in order to attain such long-term business strategy (Kitching and Blackburn, 2002).

It follows that companies may need to alter their business and product strategy (which might involve changing their work organisation) in order to use training as a vehicle for attaining proclaimed productivity gains. This becomes problematic for an industry like construction which is risk averse and resistant to change, in addition to traditionally having low levels of investment in research and development (Egan Report, 1998). It can be argued that this is a sign of discord between the notion of

'skills and productivity', as portrayed in government skills policy, and the realities of a complex industry as construction when it comes to participation in training.

Nonetheless, the results of this research demonstrates that construction companies should actively participate in apprenticeship schemes, e.g. through providing placements for apprentices, in order to meet the future skills needs of the industry. This means in practice that smaller companies could make use of the support services available from the Construction Industry Training Board (CITB), currently known as ConstructionSkills. This may take the form of claiming training grants to offset the cost of training NET and at the same time considering taking on apprentices available through the CITB 'Managing Agency' service.

Instead of companies complaining about skills shortages, they can play an active role in resolving them. This requires adopting a proactive approach in planning their skills and training requirements, which could be through developing and implementing a formal development and training plan. This plan should be aligned with the strategic objectives of the business. The idea is that companies could invest time and resources now (i.e. being forward looking) in planning for future skills requirements rather than waiting until they experience severe skills shortages.

Part of the training and development plan could include reviewing or accrediting the skills of their existing workforce through OSAT and CSCS schemes. Companies can take the initiative in addressing their workforce skills requirement as opposed to waiting for it to be imposed by clients. OSAT and CSCS schemes could also be used as a trigger for enhancing and developing the skills of their existing workforce rather than being a mere response to contractual pressures. Indeed construction companies need to embrace a positive attitude towards training activities which should be an integral part of their business activities. This becomes imperative when considering that the construction industry is largely regarded as labour intensive.

CONCLUSION

Despite widespread assertions that SMEs are reluctant to participate in training, this paper has revealed that SMEs currently participate in skills and training initiatives relating to qualifying skills of the existing workforce. However, they are keen in the future to participate in NET training schemes, which suggest that current UK government skills policy is justified in focusing on attracting new entrants through its newly formed Apprenticeship Taskforce. This focus should continue in relation to attempting to attract new entrants' apprentices and professionals to meet the industry's needs.

When it comes to the notion of 'skills for productivity' in government skills policy, the results indicate that the current emphasis of SMEs seems to be on fulfilling immediate contractual conditions rather than on developing skills for the future or enhancing productivity and performance, which could be deemed of a higher priority. Thus, the focus on promoting skills and training initiatives on the basis of enhancing companies' productivity and/or performance may not necessarily resonate with employers as it does not address their key or short-term concerns. This situation is unlikely to change in the foreseeable future given the increasing demands placed on SMEs, such as complying with sustainability standards.

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Appendix 5: **SSC contractual KPIs**

SSC Contract Table 1a

SECTOR SPECIFIC OBJECTIVES

Related SFBN Strategic objectives	Indicators	Targets ⁸		Baseline 2004 (UK)	Sources	CITB-CS person responsible for reporting ⁹
		2005	2006			
Reduce Skills Gaps and Shortages	No. of new entrants to the industry	88,000	88,000	88,000	Labour Force Survey	xxxxxxxxxxxxxxxxxx
	UCAS applicants to undergraduate construction-related degree courses	10,403	11,443	7,917	UCAS	xxxxxxxxxxxxxxxxxx
Improve productivity, business and public service performance	DTI productivity KPI records sound industry performance.	122 ¹⁰	122	122	DTI	xxxxxxxxxxxxxxxxxx
	ConstructionSkills will share progress on its ongoing analysis of the links between skills and productivity: Skills for Productivity report – Autumn 2005 Eng Doctoral study <ul style="list-style-type: none"> · Plan of work – Autumn 2005 · Interim report – March 2006 · Evidence based commentary – Sept 2006 	n/a	n/a	n/a	CITB-CS Research team	Research Team (Mohamed Abdel-Wahab / Guy Hazlehurst)

⁸ Unless otherwise stated, the year end for targets is 31st December.

⁹ Names are not revealed for confidentiality purposes except for the KPI that concerns the EngD research scope.

¹⁰ Productivity index - where 100 = productivity level per worker in year 2000. Productivity is measured as the median value added per worker.

	No. of companies with IIP or Training Plans	3,412	3,923	2,727	CITB-ConstructionSkills and CITB NI grant records.	xxxxxxxxxxxxxxxx
	No. of companies investing in training	21,100	22,200	20,901	Grant records for CITB-ConstructionSkills and CITB NI	xxxxxxxxxxxxxxxx
Related SfBN Strategic objectives	Indicators	Targets		Baseline 2004 (UK)	Sources	CITB-CS person responsible for reporting
		2005	2006			
Increase opportunities to develop and improve the productivity of everyone in the sector's workforce, including action to address equal opportunities	No. of competence based registration scheme cardholders	829,872	943,872	723,297	CITB-ConstructionSkills, CITB NI No. of CSCS, CPCS, CSR and affiliated scheme card holders	xxxxxxxxxxxxxxxx
	No. of female and ethnic minority entrants/trainee recruits (STEP)	322	386	259	CITB-ConstructionSkills. GB only	xxxxxxxxxxxxxxxx
	Review of current diversity data to identify key bottle necks /barriers to increasing the diversity of the workforce (particularly at graduate level); development of appropriate strategy and associated targets to address problem areas	Report showing ConstructionSkill s' key diversity research findings	TBC	n/a	ConstructionSkills	xxxxxxxxxxxxxxxx

Related SfBN Strategic objectives	Indicators	Targets		Baseline 2004 (UK)	Sources	CITB-CS person responsible for reporting
		2005	2006			
<p>Improve learning supply, including the development of apprenticeships, higher education and of national occupational standards</p>	No. of apprentice completions	4,025	4,728	2,611	CITB- ConstructionSkills. GB only	xxxxxxxxxxxxxxxx
	% of apprentice completions	40%	50%	33%	CITB- ConstructionSkills. GB only	xxxxxxxxxxxxxxxx
	No. of VQs achieved via Qualifying the Workforce drive	25,100	35,100	17,778	CITB-ConstructionSkills CITB NI	xxxxxxxxxxxxxxxx
	Secure robust data from Awarding Bodies on assessor capacity so that targets can be set that will satisfy assessment demand driven through OSAT (on-site assessment and training) and Qualifying the Workforce.	CITB-CS to develop and implement an action plan to encourage all relevant Awarding Bodies to record assessor activity data in a consistent way.	TBC	N/A	ConstructionSkills	xxxxxxxxxxxxxxxx

SSC Contract Table 1b

SECTOR SPECIFIC OBJECTIVES

Related SFBN Strategic objectives	Indicators	Targets		Baseline 2004 (UK)	Sources	CITB-CS person responsible for reporting
		2005	2006			
Improve learning supply, including the development of apprenticeships, higher education and of national occupational standards	Capture of data and target setting for number of apprentice completions in NI	Capture data and agree targets for 2006 onwards	TBC	n/a	CITB NI	xxxxxxxxxxxxxxxx
	% of apprentice completions in NI	Capture data and agree targets for 2006 onwards	TBC	n/a	CITB NI	xxxxxxxxxxxxxxxx
	Target setting for number of starters on undergraduate construction related degree courses	Analyse data and agree targets for 2006 onwards	TBC	Not yet available	HESA	xxxxxxxxxxxxxxxx

Appendix 6: Telephone survey questions

(N.B. this is only the section developed for the scope of the EngD research, which was integrated with the major telephone survey commissioned by CS)

- 3) **How much of a priority are each of the following for meeting your business objectives: high, medium or low?**

	Priority level			
	High	Medium	Low	DK
Training new entrants	1	2	3	X
Qualifying your existing workforce	1	2	3	X
Management training	1	2	3	X

Appendix 7: CITB-CS performance scorecard

CITB-CS performance scorecard 2007

Target	2007 Target	2007 Achieved	2006 Achieved
1 Proportion of employers claiming grant Improving business performance	36.0%	36.1%	34.6%
2 Employers investing in training – Training Plans and liP Improving business performance	4,000	5,306	4,100
3 NVQ/SVQ achievements through OSAT and EWPA Qualifying the existing workforce	45,000	48,531	32,284
4 Health and Safety Test passes Qualifying the existing workforce	231,000	418,650	275,664
5 Recruit female and ethnic minority trainees Recruiting qualified new entrants	463	299	387
6 Framework achievements Recruiting qualified new entrants	70.0%	77.2%	67.6%
7 Programme-led Apprenticeship starts Recruiting qualified new entrants	2,000	2,932	1,058
8 STEP into Construction job outcomes Recruiting qualified new entrants	525	1,499	1,119
9 NCC adult training efficiency Driving efficiency	74.0	76.3	77.0
10 Levy/Grant cost efficiency Driving efficiency	1.35%	1.02%	1.24%
11 Non-Levy income (net) margin (£000s) Maximising effectiveness	15,660	26,015	12,623
12 Employee satisfaction survey Maximising effectiveness	43	41	41
13 Employer satisfaction survey Maximising effectiveness	7.5	7.6	7.4
14 ConstructionSkills awareness Maximising effectiveness	46%	48%	43%
Board evaluation Maximising effectiveness	Target	Exceeded	Above

Source: CITB-CS Annual Report and Accounts, 2007