Knowledge Transfer Partnerships in the construction industry:
it takes three to tango!

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Abstract

The construction industry must significantly improve its performance if it is to compete in the long term, states ConstructionSkills (CS). In an industry where 95% of the construction firms in the UK employ fewer than 10 people, CS consider it vital that Small Medium Enterprises possess the necessary business skills to increase their profitability, if industry-wide performance targets are to be achieved.

Knowledge Transfer Partnerships (KTPs) are a three-way collaboration normally between a university, a company and a recently qualified graduate. Under the joint supervision of the university and the business, the Department of Trade and Industry seek to: transfer knowledge and the spread of technical and business skills; increase the extent of interactions by businesses with the knowledge base; stimulate business training and research; and provide company-based training for recently qualified people. This paper examines the potential benefits that KTPs can offer the construction industry and academia. The findings of an on-line questionnaire and case study support the view that KTPs are closely aligned with the sector’s needs. Opportunities to enhance industry performance and the flow of knowledge between partner organisations are plentiful, but success ultimately relies upon the commitment of senior management within the company, the KTP Associate’s capabilities and the quality of support from the knowledge base.

Keywords: knowledge transfer; small medium enterprises; training
1. Introduction

The Construction Industry Training Board (CITB) report *Managing Profitable Construction* states that construction companies with higher skills “make more money, complete more projects on time and have more satisfied clients” (CITB, 2000). It is a view widely accepted by industry bodies such as the Construction Industry Council (CIC), professional organisations and the UK Government. The DfES White Paper *The future of higher education* (DfES, 2003), for example, seeks to encourage the exchange and development of knowledge and skills by: strengthening the Higher Education Innovation Fund (HEIF); using HEIF to support Knowledge Exchanges; and helping Sector Skills Councils to broker collaborations between business and universities (paras. 3.4:3.9). Similarly Knowledge Transfer Partnerships (KTPs), another government initiative introduced in mid-2003, seeks to enhance business performance through the better use of knowledge and skills that reside within the UK knowledge base (DTI, 2005).

This paper explores the rationale for KTPs, the nature and scope of KTP activity in the construction sector and the attitudes and opinions of stakeholders in current partnership agreements.

2. Knowledge Transfer Partnerships

Agrawal (2001) provides a detailed review on the literature concerning university knowledge transfer. Identifying four categories in the research: firm characteristics; university characteristics; geography; and channels of knowledge transfer e.g. publications, patents and consulting; Agrawal concludes that the process of knowledge transfer is complex and that success relies on many factors.

In the United Kingdom, Knowledge Transfer Partnerships (KTP) is arguably the leading initiative for promoting the transfer of knowledge and skills from researchers to business (DTI, 2005). KTPs are similar in nature to their predecessor - Teaching Company Schemes (TCS) – and are widely regarded as having operated successfully, delivering strategic change, providing unique opportunities for learning and creating measurable business benefits (Doyle, 2006).
The partnership comprises three stakeholders: the Associate; the Company; and the Knowledge Base. A recent graduate i.e. the Associate, works on a project (typically of two to three years duration) in a company setting to transfer the knowledge the Company is seeking into the business (KTP, 2004). Under the supervision of both an academic, from the Knowledge Base, and senior company representative, the Associate is required to implement a detailed action plan, which comprises a series of tasks aimed at improving the competitiveness and productivity of the business.

The Associate is encouraged to adopt a proactive approach, working under limited supervision, and to engage in a range of personal development activities. Associates must register on the NVQ (Level 4) in Management with the Chartered Management Institute and participate in the KTP Associate Development course. Registration for a higher degree with the Knowledge Base is also the norm. Associates present a mini-project early in the KTP and on completion produce a Final Project, which is graded by independent assessors. Assessment of KTPs in 2004/05 show that 94% of these reports scored good/satisfactory i.e. Grade 1-4, and 6% scored bad/unsatisfactory i.e. Grade 5-6 (Momenta, 2006).

3. KTPs in the Construction Industry

Despite the success of the original TCS, the scheme had not always enjoyed a particularly high profile in industry or academia (Howell, 1999). Arranz and Fernández-Arroyabe (2000), for example, suggest that knowledge transfer relies on the parent organisation and culture, scientific activity and the industrial environment. In February 2006 there were 1053 current KTPs of which only 39 companies fell within the construction standard industry classification (see Fig. 1) – a marked decline on the previous two years. However, the nature and scope of these projects are diverse. The main knowledge/technology areas involved in these partnerships are shown in Table 1. For example, partnership objectives include the design and implementation of a business structure to improve and sustain business performance (Partnership Number 53) and the development of expertise in the acoustic assessment of buildings to enable an integrated air, noise, fire testing and sealing service (Partnership Number 1001).
FIGURE 1: Knowledge transfer activity in the construction sector (adapted from DTI, 2005)

<table>
<thead>
<tr>
<th>Knowledge/Technology Area</th>
<th>Number</th>
</tr>
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<tbody>
<tr>
<td>Advanced Information Technology</td>
<td>1</td>
</tr>
<tr>
<td>Civil Engineering</td>
<td>3</td>
</tr>
<tr>
<td>Computing (excluding application to Manufacturing Engineering)</td>
<td>7</td>
</tr>
<tr>
<td>Design</td>
<td>2</td>
</tr>
<tr>
<td>Electrical/Mechanical Engineering</td>
<td>3</td>
</tr>
<tr>
<td>Management Science</td>
<td>6</td>
</tr>
<tr>
<td>Manufacturing Engineering</td>
<td>5</td>
</tr>
<tr>
<td>Marketing</td>
<td>4</td>
</tr>
<tr>
<td>Materials</td>
<td>2</td>
</tr>
<tr>
<td>Process Engineering</td>
<td>4</td>
</tr>
<tr>
<td>Science (excluding Biological Science)</td>
<td>2</td>
</tr>
</tbody>
</table>

TABLE 1: KTP Knowledge/Technology areas within construction companies (DTI, 2005)

To assess the value derived from current partnerships, the benefits commonly associated with KTPs were extracted from the literature and used to create an on-line questionnaire (see Table 2).
TABLE 2: KTP statements used in the on-line questionnaire

<table>
<thead>
<tr>
<th>Reference</th>
<th>Statement</th>
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<tbody>
<tr>
<td>Q5a</td>
<td>Facilitates the transfer of technical knowledge from the Company to the Knowledge Base</td>
</tr>
<tr>
<td>Q5b</td>
<td>Facilitates the spread of business skills from the Company to the Knowledge Base</td>
</tr>
<tr>
<td>Q5c</td>
<td>Facilitates the transfer of technical knowledge from the Knowledge Base to the Company</td>
</tr>
<tr>
<td>Q5d</td>
<td>Facilitates the spread of business skills from the Knowledge Base to the Company</td>
</tr>
<tr>
<td>Q5e</td>
<td>Improves the productivity of the Company</td>
</tr>
<tr>
<td>Q5f</td>
<td>Identifies opportunities for research to be undertaken by the Knowledge Base</td>
</tr>
<tr>
<td>Q5g</td>
<td>Facilitates the development of business-related teaching materials</td>
</tr>
<tr>
<td>Q5h</td>
<td>Enhances business-relevant training undertaken by the Knowledge Base</td>
</tr>
<tr>
<td>Q5i</td>
<td>Increases the skills of existing staff within the Company</td>
</tr>
</tbody>
</table>

Momenta circulated the questionnaire to all current construction-related KTPs and respondent data, collected in a Form Data to Email System, was extracted to a spreadsheet and imported into SPSS for analysis.

Box-plots were considered to be the most useful tool to present and interpret the ratings since they provide a visual representation of the distribution of a variable (see Fig. 2). Respondents were asked to rate attitude statements on a 5 point scale (1=strongly disagree; 5=strongly agree) and provide one example of knowledge transfer from the Knowledge Base to the Company and vice versa. Over a three-week period 21 respondents took part in the survey comprising Associates, Company Supervisors and Academic Supervisors.

Each shaded box represents the responses between the 25th and the 75th percentile for one statement and the thick line across the box is the median. Whiskers indicate the lower and upper extremes of the range (SPSS, 1998). For example Question 5a, which examines the transfer of technical knowledge from the Company to the Knowledge Base, has an inter-quartile range between 3 and 4, a median score of 3 and lower and upper extreme values of 2 and 5 respectively.
FIGURE 2: Box plot showing the perceived benefits of construction-related KTPs

Hence the box-plot shows that the majority of respondents ‘agree’ or ‘strongly agree’ that KTPs facilitate the transfer of technical knowledge and business skills from the Knowledge Base to the Company, improve the productivity of the Company, identify opportunities for research to be undertaken by the Knowledge Base and increase the skills of existing staff within the Company. However, it is less clear whether KTPs facilitate the transfer of technical knowledge and business skills from the Company to the Knowledge Base and the development of business-related teaching materials (median = 3). Surprisingly KTPs seemed least likely to enhance business-relevant training undertaken by the Knowledge Base (median = 2).

Examples of knowledge transfer from the Company to the Knowledge Base largely comprised contextual issues:

- Better understanding of the impact of environmental & market forces on the construction industry.
- Knowledge of how SMEs operate in practice.
- The Decent Homes Standard and it's implication for the UK building industry.
However, knowledge transfer from the Knowledge Base to the Company commonly took the form of expert advice or consultation. Examples included:

- *The use of throughput based production techniques.*
- *Design and undertaking experimental research & development.*
- *How to use international standards.*

The survey, therefore, succeeds in identifying some of the many and varied benefits associated with KTPs. But how did these develop? What factors contribute to the success of a KTP? To answer these questions, we now turn to a more detailed case study of a current partnership.

4. **Case Study**

The business is a small, but rapidly expanding, specialist construction company involved in historic building restoration, refurbishment of residential and commercial buildings, project management and design and build contracts. The company has two principal aims: to become proactive in the market place, developing partnerships with suppliers and clients; and to explore new opportunities for business which complement their current activities. Hence the role of the Associate, following an audit of the company and the external environment, is to develop and implement business and marketing strategies that support the company’s current and future activities.

Whilst the work to be carried out in the KTP is not yet complete, this case study offers examples of company/knowledge provider interactions and draws on the experiences of the company supervisor, academic supervisor and Associate to provide further insight into the potential benefits that KTPs can offer.

**The Company**

By becoming more proactive and improving internal performance, the company is seeking to gain a competitive advantage over other companies in the region. Greater awareness and knowledge of the market place has already lead to improved decision making:
This is our first KTP project and we are delighted – it’s had an immediate impact on our business. The Associate brings a fresh pair of eyes to the business and the audit of past tendering successes and failures was much needed. We’ve never had the time to look back, we just get on with the next job.

Improved knowledge of different building techniques, approaches to conservation and sustainable development is also crucial to support the company’s ambitious plans as it enters new market sectors. Whilst the Associate did not bring construction-related technical knowledge, the company has gained tangible benefit from the knowledge provider’s expertise:

The hospital job is breaking new ground for us – we need to understand more about the planning issues and sustainability. The Uni. is able to provide both as they have such a wide range of courses. And they know their stuff – the input on low carbon emissions was great.

The University
The key challenge for academic staff is to create a sustainable and innovative business strategy for a company which is operating in an extremely conservative market sector. With so many new ideas, however, ranging from the development of a micro-brewery to the introduction of life-style contracts, the supervisor was initially concerned that the KTP would be difficult to support:

This is first time I have supervised a KTP and it seemed quite a challenge at the beginning. The company had so many ideas and they had such belief in our [University’s] abilities. But it’s been as much a learning process for me as it has been for them – I know far more about the research in my own department now.

The willingness by the company to deliver guest lectures on residential conversion work and planning case studies and to release commercial management data for use in
student assignments, also provided tangible evidence of interactions of the business with the knowledge base (see Fig. 3).

However, the academic supervisor recognised that in addition to the transfer of explicit knowledge, working closely with the company had facilitated the transfer of implicit knowledge.

Yes, [the company] has come in and delivered lectures but it’s also true that staff have learnt more about SMEs and the working environment, simply by our visits and chats with company staff.

The Associate
Arguably the principal benefits resulting from the KTP were to be reaped by the Associate. Opportunities to gain commercial management experience and to advise on business strategy were complemented by more formal personal development plans. The Associate, as part of the KTP process, registered for an NVQ (level 4) management qualification and enrolled on a Masters by Research. In addition, the KTP enabled the Associate to apply for professional membership of the Chartered Management Institute and Chartered Institute of Marketing.

I left a full-time job for a short-term contract, but it’s been the best move. [The company] have been really supportive. They’ve given me the title of Business Development Manager and I feel I’m listened to. I hope to make a real difference and that counts so much.

In this case study the project duration is only 18 months. Accordingly, effecting the changes envisaged by the company is regarded as a major task. KTPs are normally of 2-3 years duration and the tight timescale had put the Associate under considerable pressure.
5. Discussion

Undoubtedly the success of a KTP is dependent upon the relationship between project stakeholders. As Wood (2005) suggests, the principal barrier to successful partnering is trust, which is seen as the key to unlocking improved business relationships and performance. Moreover, he considers trust to be the precursor to developing other critical success factors such as openness, co-operation and teamwork.

Similarly, the culture within the company is crucial. Blyth (2003) suggests that many SME managers remain cautious about entrusting a relatively inexperienced young graduate with a business-critical project. If the Associate is accepted as a key member of the team, whose remit is aligned with the strategic development of the company, there is a greater chance of achieving the goals set out in the KTP agreement. However, the Associate is employed by the knowledge partner, which can lead to misunderstandings and the perception that the project is an academic or student-related exercise. It is vital, therefore, that the Associate receives senior management support and that the academic supervisor makes regular appearances at the Company.
The survey and case study highlight the variety of benefits to be gained by the Company and the Knowledge Base (see Fig. 4). Moreover, these are complemented by the Associate’s personal development.

FIGURE 4: Model of the knowledge transfer process

A measure of the KTP’s success is whether the Associate remains with the Company – and anecdotal evidence suggests that this is frequently the case. Hence the investment in training and development is likely to be rewarded in the longer term after the KTP has elapsed.

6. Conclusion

Unfortunately, the uptake of KTPs within the construction industry appears to be waning. Greater publicity, targeting particularly the SME sector, is needed. Whilst the DTI and Momenta are actively seeking to raise industry awareness, the UK Government funded Construction Knowledge Exchange (CKE) also has a key role to play in promoting the benefits of this initiative. The CKE, a recent recipient of Higher Education Innovation Funded Phase 3 continuation funding, is well-placed to act as a broker between industry and academia, thereby fostering new collaborations and partnerships.
Acknowledgements

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