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Innovation in the Construction and Property Management Industries

***Case Studies of the Knowledge Transfer
Partnership Scheme***

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Abstract

Purpose

The purpose of this practice paper is to examine how the Knowledge Transfer Partnership (KTP) scheme has been employed to introduce change and deliver business benefit in the construction industry.

Methodology/approach

The paper begins with an introduction to the KTP scheme and its context within the University of Gloucestershire which serves as an introduction to three case studies, each one covering a 21 - 24 month time span. The cases draw their empirical material from the experience of managing the KTPs, interviews, meeting minutes, board papers and final reports.

Findings

All three case studies have been successful in the introduction of new thinking or new ways of working in different areas of business. In one case study, a new marketing strategy was developed and implemented; in another, a new consultancy capability has been developed and embedded in the company; and in the third, new information systems were introduced to support corporate growth.

Originality/value

The value of the case studies lies in their originality and the paper highlights the value of the KTP scheme as a catalyst for the introduction of new ideas and initiatives in three different sectors of the construction industry. The paper also illustrates how academics can work productively in a commercial environment with industry partners

Key Words: Innovation, SMEs, Knowledge Transfer, marketing strategy, information systems.

Classification: Practice paper

Introduction

The construction industry has long been a focus for innovation in the deployment of new materials and construction methods, and the application of innovative designs and architectural concepts. The property management industry has also seen innovative change in recent years, not least caused by the advent of the internet and the evolution of new routes to market for the main protagonists in the construction supply chain. Innovation is indeed at the heart of UK Government strategy to reinvigorate UK industry, and one of its key vehicles for promoting innovative change is the Knowledge Transfer Partnership (KTP) scheme. This paper examines three case studies of how the KTP scheme has been used to introduce innovative concepts, ideas and practices into three small-to-medium sized

enterprises (SMEs) operating in the planning, construction and property management sectors. These projects have been undertaken by private sector companies working in conjunction with the University of Gloucestershire, as they strive to adapt to rapidly evolving business and technology environments and changing customer needs.

The Knowledge Transfer Partnership (KTP) Scheme

In one guise or another, the KTP scheme has been in operation for over 25 years. The scheme has consistently delivered major business benefits for companies working with local universities across the UK. Indeed, in recent years, the scheme has brought an average bottom-line benefit of over £200K per annum (DTI, 2006) to the companies participating in the scheme. It brings government funding to enable organisations to take advantage of the wide range of expertise available within universities. Essentially KTPs can be viewed as a four-way partnership between university, the company, the graduate (or 'Associate' as they are termed), and the Department of Innovation, Universities and Skills (DIUS), who provide over 50% of the funding for the project for SMEs (Figure 1) through the Technology Strategy Board (TSB), the research councils, and regional development agencies. The general aims of KTPs are to:

- Improve the competitiveness of the company,
- Enhance the business knowledge and understanding within the university, and
- Advance the career prospects of the KTP Associate.

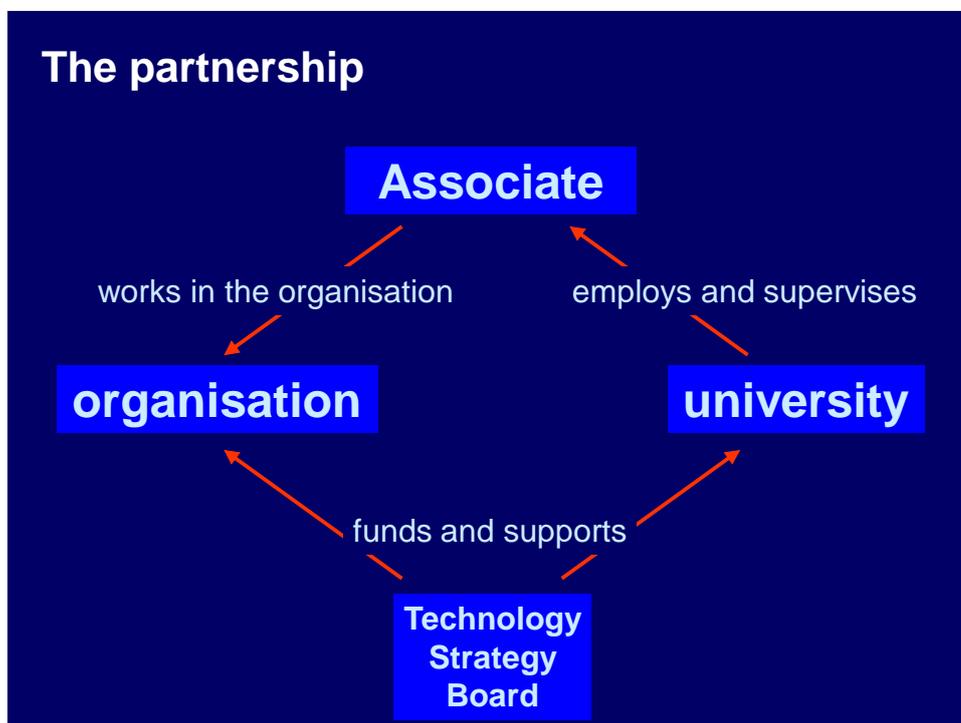


Figure 1. The four-way partnership that underpins KTP projects

The partnerships involve the Associate working in an organisation, normally for two years duration. During this period an academic from the University is assigned for 20 days per annum to support and supervise the project, and bring in specialist knowledge and expertise as appropriate to ensure project delivery. Training and equipment are provided, and the total value of the scheme to the partner company is £40,000 per annum or £80,000 over the typical two years. A number of potential benefits are associated with KTPs. The benefits to the company include the potential identification of new opportunities for development and growth, and the stimulus to research their outcomes. KTPs also provide dedicated additional

resources to enable organisations to deliver project benefits; and they allow organisations to access new developments in specialist fields and to exploit innovative concepts and thinking in business.

At the same time, universities can derive a number of collective and individual benefits from participation in KTPs. Many of these derive from the use of KTP projects as case studies for both teaching and research. The case study method is well established as an educational technique in both higher education and continuing professional development, and some of the documented case studies coming from KTP projects can be used in both situations. For teaching-led universities, which nevertheless have a clear commitment to research-informed approaches, KTPs offer particular benefits in providing new and interesting materials for inclusion in the curriculum. They are also interesting in that they occupy a central position in the continuum between 'research' and 'evaluation' (Healey, 2000), where research may be seen as the 'seeking out of new knowledge and understanding', whereas evaluation is the 'search for accountability, of deliverables delivered of outcomes attained' (Baume, 2005). KTP projects provide opportunities for academic staff to work on live business challenges, which allow them to maintain an up to date knowledge of business thinking and methods. They provide teaching materials to support both undergraduate and post graduate teaching through live case studies, design exercises and work placement opportunities, and the KTP Associates also have the chance to register for higher degrees and to produce research papers for publication, based on case study research.

University of Gloucestershire

The University of Gloucestershire has four campuses in the Regency town of Cheltenham and the city of Gloucester. With over 9,000 full- and part-time students and 1200 members of staff, the University offers a range of undergraduate and postgraduate courses in subject areas of Media, Art & Communications, Business, Education, Humanities, Natural & Social Sciences and Sport, Health & Social Care.

The University of Gloucestershire Business School is a major centre of expertise in Business Management and Information Technology in the South West of England and is home to over 90 staff and 2,800 students, 600 of which are on postgraduate programmes. The School offers a wide range of courses in accountancy, business management, computing, marketing, multimedia, international business, law, languages and human resource management and a good track record in research; it has spearheaded the development of knowledge transfer activities with local businesses over the past three years. Central to this success has been the approval of over thirty KTP projects during this period. The University of Gloucestershire Business School is now operating more KTP projects than any other Business School in the UK. Particular areas of expertise range from human resource management, marketing and strategy, finance and financial services to business information systems, multimedia and computing. In addition there are also specific specialisms such as the management of operations, public services management and commercial computing.

The smaller Department of Natural and Social Sciences has had a long record of successfully integrating research, knowledge transfer activities and teaching, both at undergraduate and postgraduate level. Environmental disciplines embraced include the natural and environmental sciences, environmental management, applied humanities subjects such as geography, community development and heritage management, and design-based disciplines such as landscape architecture. Research takes place across this range of subjects and teaching in these disciplines has traditionally been delivered in an integrated way. The success of this multidisciplinary approach was rewarded by the Higher Education Funding Council for England in 2004, which recognised the Department as a national Centre for Excellence in Teaching and Learning (CETL), with almost £5Million to invest in further development of the 'active learning' approach used in the Department. The

involvement of students in 'live projects in real locations with actual people', part of the active learning approach, has a strong resonance with the philosophy behind KTPs, too.

Context for the KTP case studies

There has been considerable and longstanding debate in higher education about the real value of the case study as a research and learning tool. Margerison (1978), for example, was asserting that 'we must move towards an action research and action learning frame of reference, where we gather data on the clients and work with these data to try to help the educational process' almost thirty years ago. More recently, problem-based or inquiry-based learning has followed a related approach in higher education (HE) curricula, and has been very successful as a means of focussing student interest on real cases and promoting reflective practices (Savin-Baden and Major, 2004; Harrison et al. 2003). The KTP projects outlined below fit this frame, as they have all brought about significant change in capability in SMEs through action-research centred on company processes, systems and markets. These thus stand as case examples of what the KTP scheme can achieve and also as individual cases for use in HE and management development. This builds on earlier pioneering OECD funded case study research as the basis for cross disciplinary learning in the construction and property development industries in a European context (Wynn and Taylor, 1980).

In a broader educational context, the KTP scheme is an example of the 'third wave' of activity now being pursued by many universities. This follows the Lambert Report (Lambert 2003), which recommended universities develop knowledge exchange activities between themselves and industry to complement and stimulate the established teaching and research capabilities of the higher education sector. The KTP scheme has been a key vehicle in moving this agenda forward, although the project sponsors (DIUS and research councils) have been increasingly demanding in recent years regarding the quality of projects given government support. There is now a clear requirement to provide a step change in business performance through the KTP project, that must be a product, in part at least, of significant knowledge transfer from university academics and the Associate into the company. The University of Gloucestershire has managed to make significant progress within this framework because of the combination of relevant recent industry experience of some of its staff and academic expertise in key business areas (information systems, marketing strategy, sustainability and environment).

The three case studies reviewed below illustrate how this has been applied in the construction industry in different sub-sectors. *Applied Energy* provides domestic appliances (and own some leading brands) for existing and new build properties across the housing spectrum. *Illman Young* provide landscape, architectural and master planning services, and *Building Solutions* are a construction company operating at the top end of the market. All three companies are intent on expansion and are striving to improve services, increase efficiencies, streamline processes and develop new routes to market.

Applied Energy Products Ltd

Applied Energy Products Ltd (AEPL) is a manufacturer of space heating, water heating and ventilation products sold under the brands of Creda, Redring and Xpelair. The company, which is based in Peterborough, had a turnover of under £50 Million in 2003/4 before the start of the project and employed 240 staff. The main route to market has traditionally been through electrical wholesalers. There are few formal supply contracts in this sector with most products sold on demand.

The social housing market consists of 2.5 Million properties in England alone, of which 300,000 are refurbished each year. Assuming expenditure of £1,500 per property, there is

an annualised market of £450 Million. AEPL saw a major business opportunity in dealing directly with the major specifiers such as local authorities and housing associations. In addition, there was potential for direct marketing of AEPL's products to the end-consumer via various channels (e.g. web-based promotion, direct mailing). The exploitation of this business opportunity required AEPL to change its business model from a product based company to one that offers integrated, customised solutions, covering water and space heating and ventilation in domestic dwellings, both in the social and private sector. They are now securing supply contracts of at least one-year duration by offering bespoke solutions to customer problems and new products and services, which add value to AEPL's customer offering.

AEPL marketed its range of products using sales representatives who network with UK distributors of electrical equipment to maintain brand awareness and loyalty. In this approach, no formal contracts exist between AEPL and its distributors who purchase goods on price/reliability/availability as and when necessary. However, AEPL had the engineering capabilities to develop new products and integrated solutions in the private and social housing market areas. The central challenge of the KTP project was to exploit this capability by developing new routes to market, which, in turn, required the company to make the transition from a supplier of products to a supplier of services and solutions.

AEPL recognised it did not have the skills and resources to make the shift from an indirect, product led company to a direct, serviced orientated business, and appointed the KTP Associate to develop and implement a service based marketing strategy to enter new markets. This involved a number of main stages:

- Reviewing the current approach to marketing,
- Developing a marketing strategy based on customer needs,
- Implementing, monitoring and refining this marketing programme, and
- Developing the strategy for on-going expansion of products/services.

The project completed in late 2005 and delivered additional revenues of circa £1Million in 2004/5, which increased to an additional revenue stream of £2million in the 2005/6 financial year. Significant profit increases are being achieved by increasing sales turnover in the social and private housing sectors. The implementation of a service led marketing strategy is bringing about a culture shift in company departments that will enable the company to compete effectively in the new market sectors. This will directly affect the business model and ways of working across the company operation. Existing sales staff are expanding their knowledge of the housing sector and are better placed to secure and deliver supply contracts to assist these customers to manage or sell their housing stock more cost effectively. The appointment of the KTP Associate as Social Housing Manager in 2004 acted as a catalyst for the exploitation of further marketing opportunities in the housing sector and the extension of operations into new areas.

The chief problem faced during the project was the natural resistance of employees to cultural and procedural change. This prompted the development of an innovative, 'inside-out' marketing strategy to position the company in the new sector. Initial marketing efforts focussed on the internal sales force, which had traditionally favoured one-off, high-volume transactions rather than the longer-term relationship development approach demanded by the social housing market. The project team implemented a programme of internal training on the opportunities and challenges presented by the new market. This was supported by the development of sales support tools, such as a social housing leads database, an interactive sales presentation and a streamlined tendering process. Having met with considerable success internally, this programme was 'rolled out' to external customers through the company's social housing website and a national CPD roadshow, whereby the KTP Associate delivered continuing professional development, accredited by the Chartered

Institute of Building, to social housing professionals. This was instrumental in raising the company's profile within the sector as an expert service provider.

The change in culture initiated through the programme is being extended to allow the business to expand its operations cost-effectively. Manufacturing and other departments have incorporated changes in working practices to give the flexibility, quality and delivery performance required to penetrate new market opportunities cost effectively. Existing staff have been trained in these techniques so that, as far as possible, productivity will be further increased in preference to the acquisition of new operatives. The continued association with the University of Gloucestershire will help to enable this process of change. Nigel Stanford, AEPL's Sales and Marketing Director summarised the project as 'a key instigator of our drive to provide customer specific products and services and align our culture and organisation behind this new initiative'.

Illman Young

Illman Young is a small to medium-sized landscape practice that competes with other locally and regionally based landscape practices for high quality construction design projects of circa £2-3 million. They are thus one of many small players in a very large market, but have always specialised in high quality and novel designs for challenging sites, particularly solutions that enhance the ecological status of the area. The KTP project centres on the development of expertise within the company to allow them to offer consultancy services for the design of Sustainable Drainage Schemes (SuDS). In this field, Illman Young competes with other landscape architects and, in part, with engineering consultancies that offer drainage and civil engineering design capabilities. However, the current UK design expertise is limited to a few practices, despite the recent change in legislation that now promotes SuDS in many settings.

The KTP project started in mid 2005 and completes later this year (2007). It focuses on the detailed research and design of the 'soft' landscape treatment of SuDS. Previously SuDS schemes in the UK and overseas, especially the USA, have often been characterised by adequate technical performance, but have been ecologically sterile, managerially costly and delivered unattractive outcomes. The project explores how site drainage schemes can be designed in an integrated manner to provide attractive landscape settings for new developments, that are both aesthetically and ecologically appropriate whilst fulfilling new legislative requirements for reducing the runoff generated by impermeable surfaces, and improving the quality of surface and near-surface waters.

All building developments have to satisfy both the local authority and the Environment Agency (EA) as to their proposals for the disposal of surface or storm water generated within the site. Previous philosophies for disposal of rainfall from developed areas assumed rapid disposal via drains into off-site watercourses or other drainage systems. It is already apparent that there is now an expectation that something approaching 'zero run-off' or 'greenfield rates' will be achieved to minimise the downstream hydrological impact of development. Typically, SuDS schemes involve imaginative use of ponds, small lakes, watercourses, infiltration swales, and permeable paving, with public access to interesting areas being an increasingly high priority, and these are being researched as part of the KTP. There is a growing requirement by the EA to encourage developers also to consider ecological enhancements within their proposals, either at site level or within master planning schemes for whole communities. This means the potential market is multi-billion pound nationwide as these bioengineering requirements apply across the board for all forms of development, from housing schemes, schools or hospitals to commercial and industrial sites. The research is evaluating existing SuDS schemes as well as undertaking the design of new sites that are being implemented and evaluated within the study period. The results will form the basis of a strong in-house specialism, and the dissemination of good practice around the landscape industry.

The KTP Associate has undertaken market research analysis of the potential for including SuDS schemes within new designs, based on the current client list. Illman Young are now actively promoting the use of SuDS within new projects to which they are appointed, but hitherto drainage engineers have invariably been appointed to deal with the drainage in principle. There is a need to create an entirely new philosophy of design principles and applications, which have the integrated approach that Illman Young are pursuing. In the past, Illman Young have lacked the technical expertise to seek the overall commission for SuDS design projects, which they will now expect to win with their new design capabilities. The combination with the University of Gloucestershire is working well, because Illman Young has proven expertise in landscape design but has in recent years been short on expertise in hydrology and water management. Conversely, staff in the environment area of the university have particular strengths in applied hydrology and ecology, and regularly undertake consultancy work for clients in the public, private and voluntary sectors, including the preparation of evidence for Planning Inquiries. Specifically, the university brings expertise in the following areas:

- Knowledge and skills in the technical aspects of sustainable urban drainage systems, including aspects of water quantity and quality and their interlinkages,
- Knowledge and skills in the relationships between plants and their immediate environments, and broader ecological and sustainable principles,
- Research, review and project management skills, and
- Expertise in establishing the aspirations of local communities for their surroundings.

The KTP project thus has major benefits for Illman Young. First, it enables the company to extend the scope of their commissions on new projects for existing clients by increasing their capability. Second, it allows the company to bid for projects with a specific SuDS input for which they would not previously have been considered competent. Thirdly, they can market their practice as having leading-edge expertise in the design of integrated and innovative SuDS design solutions. Fourthly, they can increase their technical competence as the skills learned become embedded within the practice through a programme of in-house staff training. Finally, it will enable Illman Young to deliver the increased profits that are predicted in their Business Plan. This is conservatively estimated at an extra £100,000 turnover per annum by 2009/10.

Illman Young will also benefit from a general uplift in awareness of SuDS issues across its staff. The range of knowledge and skills developed by the Associate is being cascaded throughout Illman Young through a seminar series ensuring that knowledge and skills developed are disseminated throughout the company. Another significant 'soft' benefit is the expansion of the company's network and influence in both private companies and public authorities. SuDS has an application in a broad range of developments, such that Illman Young's scope of operation is expanding, bringing new networking opportunities that establish additional revenue generating opportunities. The kudos and profile of the company has already been enhanced. Being able to offer SuDS design expertise is helping set the company apart from its competitors, and providing a significant point of difference when competing with other landscape design companies locally and beyond.

Building Solutions

Building Solutions employs 65 staff and is based in south Gloucester. The company is at the upper end of the construction market in quality terms, but has a relatively small market share. In the past, the company has purposefully tried to control its growth to sustain the quality of service. After 35 years of trading in the semi-rural district of Gloucestershire, there is a good recognition of the brand and loyalty on behalf of the relevant specifiers (e.g. local

authorities, defence contractors). The company's recent Investors in People programme, and ISO 9002 accreditation have helped this.

The company's business plan projects a target turnover of £10m by 2010, compared with a turnover of £5.8Million in 2005/6. The market opportunities are there, but several IT-related issues have hitherto stood in the way of sustained growth. In past years, the company has been ahead of its competitors in the deployment of IT, running a fully networked system for over twenty years. Recent growth has, however, outpaced the development of both the IT systems and the processes used by the company. At the initiation of the KTP project in mid-2005, poor business processes had become a barrier to growth, exacerbated by stand alone information systems and multiple versions of key data. Resultant problems included a lack of shared estimating intelligence, fragmented project planning, inconsistent materials purchasing, inaccurate job costing, inadequate document management and record keeping, weak customer relationship management and outdated, paper-based internal knowledge sharing.

One of the company's major sub-sectors is insurance reconstruction. These clients have highly developed systems and expect timely, accurate information on the status of contracts, together with slick processing of instructions and invoices. The company's systems were at capacity and there was an urgent need to redesign the relevant processes and establish reliable, expandable new systems. Whilst the company Board appreciated the value of completely reviewing core processes, it recognised that the necessary skills did not exist within the company to deliver a long-lasting sustainable solution that would be embedded in the business. Adopting well-conceived improvements to these processes together with the correct implementation of new technologies and training, would enable the company to achieve its growth and profit targets and improve customer service, with a resultant improvement in staff satisfaction. There is a substantial market for the services offered by the company. However, the company was reticent to grow further without knowing that its systems and technology deployment could support this growth.

The overarching objective of the KTP project was thus to install new information systems and technologies and reengineer business processes to drive through 5% cost reductions and a 15% increase in company turnover per annum.

The programme was implemented in two main stages, completing in March 2007. Stage one established a stable technology platform for Building Solutions' current and future information systems. This was an urgent priority as investment had been restricted for several years. Desktop personal computers were of variable standards, desktop software was at different version levels and there was no clear product policy. The local area network bandwidth was inadequate even for systems running at the beginning of the project. The Associate drew up a technology upgrade plan, gained budgetary approval for new desktop hardware and software and a major network upgrade. This was completed within two months of the start of the project, and involved an exceptional effort, including significant 'out-of-hours' work.

Stage two took a longer-term view of the systems required for the company to support its growth over the next five to ten years. The Associate quickly got to grips with the Building Solutions company structure and the significant number of field based workers, by running business improvement workshops and working with senior management to see how technology could support business change. This investigation identified areas for improvement and underlying technologies that could be used to facilitate new systems. These were developed into an information systems strategy that was presented to the Board in June 2006. Following Board approval, the Associate managed the procurement of new software packages in line with Board directives. The implementation roll-out had several main phases:

- Introduction of a new Customer Relationship Management package (Union Square), replacing the existing system which was not widely used within the company and which had limited functionality,
- Implementation of a new project estimating system (Conquest),
- Improvement of the use of desktop personal productivity software via training and best practice, and
- Extension of remote communications via a virtual private network (VPN) to allow connection to key business partners, sales staff and field based managers.

In the early days of stage two, the Associate identified a series of “quick wins” that helped raise the profile and perception of IT by cleansing the data in the two legacy customer databases. This involved working with secretaries and administration staff and persuading them to adhere to standard ways of working and sharing data. This laid the foundation for the introduction of the new CRM system, and the new estimating software in the latter half of the project. The Associate managed the requirements gathering and software selection for this project and had to demonstrate a thorough grasp of the company business requirements and an ability to communicate this to external companies and to the company Board. This resulted in software demonstrations from third party vendors that used realistic data and business scenarios, thus enabling the company to identify key differences in approach between vendors. This was critical in eliminating one of the other mainstream packages that had been a front-runner in the early stages.

The resultant CRM implementation ran in parallel with the estimating systems project for the final 6 months of the project and represents a step change in Building Solutions’ ability to analyse marketing and sales data and increase sales. The Associate took responsibility for testing the new systems and liaising with the software suppliers regarding systems configuration, bug fixing, change requests and supplier consultancy. The Associate also organized and led training in two main areas:

- Training to consolidate the changes made in internal processes, and to ensure that best use was made of the new systems, and
- Training and support of the key users of the new CRM system, to usher the system into the company and allow on-going support by company staff. The Associate took an innovative approach here, and authored a range of video based training materials that are available on personal computers to all users to simulate key functions on the new system.

As a result of the KTP programme, at an operational level, the company now has the capabilities to use and onward develop a new range of applications that are supporting the company’s sales processes and providing critical management information, notably in the cost estimating of projects. The company now has the tools and capabilities to focus on new software, hardware and business processes to support the sales and administration functions. In order to use the new software to best effect, Building Solutions has upgraded its IT infrastructure to improve systems performance and allow remote field working from the sales office in the new development site at Pittville in Cheltenham. In addition, the company is exploring the option of using wireless technology within the show houses to connect sales staff to the network.

Some £60,000 has been invested as part of the KTP project, in technology infrastructure (networks, servers, desktop PCs) and new software. As a result, the company is likely to use less staff as an expanding sales team is managed by the same number of managers and administration staff and not expand in line with the growth in company turnover. A realistic estimate of saving is some £15,000 per year. The company also now has the ability to increase the rate of sales through its effective CRM capability and improved communication to staff and customers. It is reasonable to expect an increase in sales equal

to approximately one new major contract per annum. Based on recent performance, this would yield an extra £750,000 turnover per annum (a net profit of circa £37,500). Further benefits have come from the development of project estimating capabilities, which eliminates the re-keying of data, and provides an on-line snapshot of project financing. This gives the project managers a quick effective feedback tool to guide their pricing and eliminates painstaking manual work in working out contract detail.

The KTP project was also the catalyst for the introduction of a new management structure. The critical examination and analysis of existing systems led to Board level agreement to significant process change. One main feature of this was the merging of all project contract managers, operatives and support administrators into one directorate. The company's offering now appeals to a greater range of clients because of increased technology standards (for example, in the retail sector, which is very demanding on the compatibility of their supplier's IT systems). The ability to better serve the specifier and insurance markets, through greater electronic supply chain integration, will improve not only the financial results, but also the job satisfaction of all concerned. Tony Sills, Managing Director of Building Solutions, has stressed the importance of the project 'in providing a key platform for our growth aspirations over the next five years'.

Concluding Remarks

The University of Gloucestershire has now had experience of running over 35 KTP projects over the past four years, during which period a number of important lessons have been learned. The recruitment of an Associate who can 'deliver the project' has proved critical, and our experience suggests it is better to wait until the right candidate can be found rather than compromise on Associate knowledge and capabilities. It often takes six months to get the right Associate into place, but the additional time is well invested. The best Associates have proved to be demanding of themselves, and also demanding of the company and of the academics with which they work. In a national (UK) context, 70% of Associates are employed by the company partner at the end of their KTP projects; this is borne out by these three projects, with the Associates at Building Solutions and Applied Energy remaining at the companies as full-time employees after project end. The project at Illman Young is now entering its final stages, having encountered a change of Associate in the first year.

There have been a number of human resource problems encountered – and by and large overcome – in the course of these KTP projects. As noted above, in the project at Illman Young, the Associate left in the first year; but, after a short interlude, a replacement was recruited and the project is now progressing well. At Building Solutions, the company supervisor and line manager was changed within the first six months of the project (because of illness), and new relationships had to be built. The role of the academic supervisor is critical in these circumstances – they have not only to provide continuity in the management of the project, but also manage relationships and expectations between and amongst company staff, university staff, the Associate and the DIUS. This is a difficult role that has often tested the capabilities of academics, which is valuable experience as universities attempt to broaden their interface and relationships with industry.

The KTP project will almost inevitably change in scope to some degree over the two-year duration. This is not a major concern so long as the academic challenge remains and benefits are being delivered to all three parties; in these circumstances, such change has normally proved constructive and value adding. KTP projects often introduce significant process change within the partner companies, but the running of these projects is also encouraging change in the universities as academic departments work with the private sector in a formalised business-to-business relationship. In this context recent research on university-industry linkages has found that the 'misalignment of goals and reward systems reflects motivational differences. While academic promotion is based on research

performance and publications, industry staff is judged on 'the result in the crude sense'. (Plewa et al, 2005). Tighter resource scheduling (of academic commitment) and hybrid contracts for the Associates – who are employed by the university but work in the company partner - are just two areas where changes are occurring, as the agendas of the university and the company partners are aligned. Retaining key academics that are capable of bridging the divide between academia and business is another issue that is emerging as knowledge transfer activities grow in the university sector nationally.

Overall, these projects are proving of value, both to the companies where change is being delivered, but also to the university in contributing to their research and teaching. These case studies fit the 'action research and action learning frame of reference' cited above, and several KTP projects are featuring as case studies in undergraduate and postgraduate teaching as well as in research publications. A key ingredient of the KTP scheme is that it provides a dedicated resource to instigate, promote and manage key initiatives to drive the project forward. It brings in new perspectives and expertise from the University, and the DIUS provide a clear steering group process that encourages strict disciplines to ensure project delivery. It is thus not surprising that the number of projects running nationally has risen steadily in recent years and now exceeds eleven hundred in the UK.

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