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Employing Knowledge Transfer to support IS implementation in SMEs

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Employing Knowledge Transfer to support IS implementation in SMEs

Abstract

Information systems strategy is becoming an increasingly important component of overall business strategy in small to medium sized enterprises (SMEs). The need for readily available and consistent management information, drawn from integrated systems based on sound and upgradeable technologies, has led many senior company managers to review the business case for root and branch systems replacement. However, implementing new information systems (IS) is not easy and many projects fail or fall well short of their expected outcomes. Key to successful implementation is getting the strategy right in the first place and then implementing it in a controlled manner to ensure benefits delivery. This article discusses three IS projects undertaken in different SMEs, where the Knowledge Transfer Partnership scheme has been used to transfer relevant expertise from the University sector to help strategy development and systems implementation. This has led to an outline method for IS strategy development for SMEs and guidelines for the adoption and adaptation of mainstream project management and software package evaluation tools. It is hoped that this can help other SMEs progress IS strategy development and implementation more effectively, in terms of timescales, cost control and benefits delivery.

Keywords: IS strategy, knowledge transfer, software evaluation, project management, SMEs

INTRODUCTION

When SMEs expand their operations, there is normally a critical point at which sustained growth at the same rate is no longer possible without an upgrade to information systems and supporting infrastructure. Working out what to buy, from what supplier, and how to implement it can take months, even years, of effort and investment. SMEs will normally be influenced by their cultural and philosophical heritage and will be looking for value, trust and visible delivery, based on clearly defined benefits and a firm handle on costs. In some cases, this has resulted in SMEs lagging behind in terms of technology adoption. This article illustrates how a tailored and sensitive approach to IS strategy development and investment can produce value-for-money, 'common sense' solutions without undue risk. These case studies illustrate how this can produce levels of investment in IS which are not unreasonable and which still allow exploitation of leading edge solutions.

These projects have involved the transfer and development of knowledge and expertise from University academics working within the framework of the Knowledge Transfer Partnership (KTP) scheme. This scheme places experienced graduates (known as Associates) into industry to lead projects of strategic value to the company partner. They are supported by academic staff, many of which also have industry experience, working in the company for about half a day a week, to support and progress the project.

AREAS OF KNOWLEDGE TRANSFER

The development of IS strategy

Many of the theories and models of information systems strategy development are based on a logical progression from business strategy to evaluation of information requirements that leads to information systems and information technology strategies (Figure 1). Some authors (e.g. Robson, 1997) also suggest an information strategy is appropriate; process analysis, producing 'current' and 'new' process maps, also features in most IS strategy development models; and data analysis and data modelling can also play an important role in determining what systems are required.

In an ideal world, much of this makes sense and can help develop an IS strategy that is well geared to supporting future business requirements. However, many SMEs they have neither the time nor resources to undertake such a comprehensive review and analysis to determine their IS strategy. This was the case in the KTP projects, even though a dedicated IS professional was recruited for a two-year period (as the KTP Associate). There was still the pressure to research and agree what information systems were required within the first few months; and this process was running in parallel with significant IT support work and

Associate training programmes in the three companies. The need to move quickly towards an agreed IS strategy meant that compromises had to be made. This is particularly relevant to a family business SME such as TPG DisableAids, where cost control and value for money are often uppermost in Board priorities.

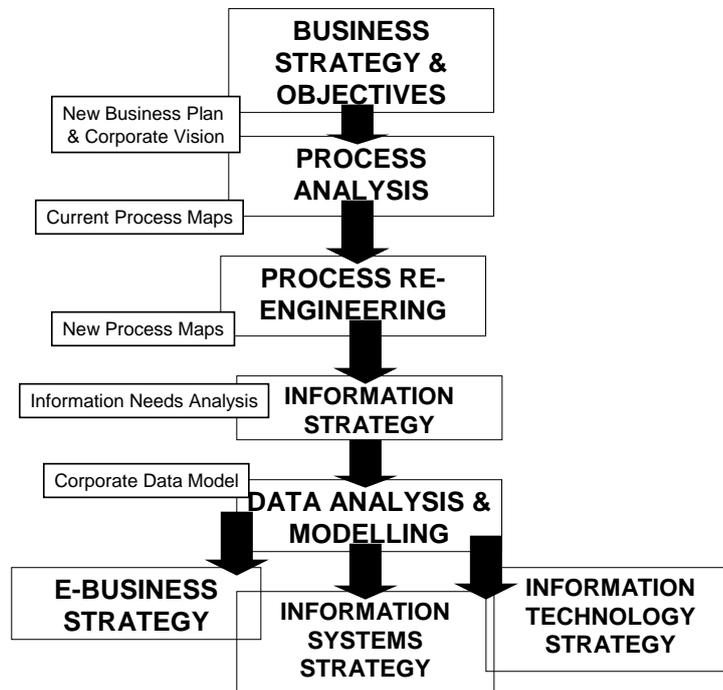


Figure 1. IS Strategy Formulation in Theory

The use of project management tools

The nineties witnessed a number of significant failures in large IS projects in the public sector, which gave rise to the development of PRINCE2^{TM1} - a project management methodology designed for the public sector in the UK, but also increasingly used in the private sector. It is owned by the Office of Government Commerce (OGC), an office of the UK Government. It is now an internationally recognised methodology and trademark.

PRINCE2 can be used 'above' systems development methodologies to provide an all-encompassing set of project management processes and components (OGC, 2005). The key features of PRINCE2 are:

- It is driven by the business case for the project – this is clearly set out and supported in the early stages and revisited at appropriate intervals across the duration of the project
- It requires a clearly defined organisational structure for the project, comprising Project Board, a project manager, and project teams (with team leaders).
- It is based on 8 main processes (each with sub-processes) to manage a project.

- There are also 8 main components that are used throughout the processes to support and advance the project
- In addition, there are three techniques that may be used at different stages within a project, plus 36 main products and 10 project management roles.

PRINCE2 might be viewed by some as 'too big a beast' to add much value to an IS project in an SME. However, as the OGC have pointed out, PRINCE2 is 'a complementary framework of processes, components and techniques. The art of implementing PRINCE2, therefore, is in choosing which of those elements to use and how rigorously to apply them' (OGC, 2006). If the methodology is tailored in the right manner, it can provide a powerful framework for project management and delivery, allowing the project team to use a wide range of tools and processes as and when they are needed. This was of particular value at Allpay.net, a slightly larger SME than the other two companies considered here, and where their core business is technology related, and a sizeable IT department already existed.

Evaluation and implementation of ERP packaged software

Enterprise Resource Planning (ERP) packages came to market in the early 1990s as the spread of the UNIX operating system as a *de facto* standard for mini computers and the increasing dominance of the Intel chipset led to a massive surge in the packaged software market. Building on the earlier Materials Requirements Planning (MRP) packages, ERP systems went much further, providing modules for sales order processing, ledgers, payroll and personnel as well as MRP. Throughout the 1990s, the functionality of these packages from major vendors – notably SAP and Oracle - continued to expand, partly through acquisition of competitors' packages which were, over time, incorporated into the mainstream ERP offerings. As Koch (1999) has noted, 'ERP attempts to integrate all departments and functions across a company onto a single computer system that can serve all those departments' particular needs'.

The increased take-up of ERP software, particularly by large companies operating globally, coincided with the spread of business process re-engineering (BPR) as a management concept employed by many companies to improve efficiencies and reduce overheads. The two became closely linked as BPR projects were frequently combined with the introduction of integrated ERP solutions. As Turban et al (2002) have remarked, 'ERP forces discipline and organisation around business processes, making the alignment of IT and business goals more likely'.

¹ PRINCE2™ is a Trade Mark of The Office of Government Commerce

However, many ERP projects have not delivered their expected benefits. As Jeffrey and Morrison (2000) recently concluded, 'you don't have to go far to bump into lots of evidence that shows how ERP software has not delivered on the promises of vendors'. In the 21st century, ERP projects are no longer the domain of large companies alone, nor are ERP products limited to the few major global software players. Many of the smaller software suppliers now offer a fuller range of functionality, and integrated software systems are now on the business agenda of many SMEs. However, evaluating all the possible options for ERP procurement can be a protracted and forlorn process, if there is not an acceptable match between systems functionality and business requirements. In the nineties, as packaged software became the norm, there appeared on the market a range of new software development methods and tools (Redmond-Pyle, 1996). These included Hoskyn's PRISM (Professional Information Systems Management) methodology, which includes a straightforward, logical, process checklist for software package evaluation and installation (Buy-Build Methodology). The deployment of such an approach can help ensure an SME makes an appropriate package selection. This is particularly valuable in an SME such as Fixing Point, where there were no IS/IT staff prior to the commencement of the KTP project, and experience of such tools was minimal.

The KTP Scheme

The KTP scheme (Knowledge Transfer Partnerships, 2008) can be used for any project that gives strategic bottom-line benefit to the company partner, but it is often geared to projects that inject innovation and/or new technology into the operations and culture of the company (Wynn and Jones, 2006). The UK government will fund circa 50% of the employment and training costs of an experienced graduate (the KTP Associate) to lead these key change projects. The government will also fund circa 50% of the costs of supervision from University academics to support the project and bring transfer of new knowledge from university to the company. 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.

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.

Measuring the impact of knowledge transfer

In measuring the impact of knowledge transfer in these case studies, models of e-business adoption are of interest and value. In the 1990s, 'e-business' was closely associated with the use of the World Wide Web for undertaking business. However, technology development and convergence, which has been one of the key drivers of e-business uptake by SMEs, has also resulted in a merging of concepts and definitions.

Mainstream information systems that process and report a company's business transactions such as the systems implemented in these three case studies, are now often accessed via the intranet or have a web 'front-end', and thus the differentiation between systems that use 'web-technologies' and those that do not, lacks clarity and relevance. Most authors now see 'e-business' as more or less synonymous with all information systems. Chaffey (2002), for example sees e-business as 'all electronically mediated information exchanges, both within an organisation and with external stakeholders supporting the range of business processes', whilst Rowley (2002) notes that 'e-Business is a wider concept that embraces all aspects of the use of information technology in business... It includes not only buying and selling, but also servicing customers and collaborating with business partners, and often involves integration across business processes and communication within the organisation'. The broader conceptualisation of e-business allows us to use models recently developed to assess the impact of knowledge transfer in the three companies considered in this paper.

CASE STUDIES

This article looks at strategy development and implementation drawing on three SME case studies, all of which elected to pursue different technical and managerial options. The three aspects of IS strategy outlined above are reviewed in three different case studies – first the formulation of strategy, which is examined at TPG DisableAids, second, the evaluation, selection and installation of mainstream software packages, focussing on an ERP implementation at Fixing Point, and third, the tailoring of the PRINCE2 methodology for project management at Allpay.net.

Case Study 1: The development of IS strategy at TPG DisableAids, Hereford

Company profile and project background

TPG DisableAids is a provider of equipment for the elderly and disabled. This is a 'second-generation' family business, now run by Alastair Gibbs (managing director) and his sister Mandy Harrold (Finance Director). The company is a value added distributor of a wide portfolio of products ranging from devices to allow arthritis sufferers to safely utilise various household products and equipment, through to customised mobility

equipment and patient lifting and hoisting equipment for healthcare professionals. TPG DisableAids also provides after sales support for mobility, transport and lifting equipment to private and public sector customers. More recently, it is increasingly providing large multi-site contracts to install, maintain and repair public sector equipment as well as undertaking large installations, providing disability equipment for whole healthcare facilities and selling maintenance and repair services. The company's current business plan is to increase its turnover from £4.1m in 2006/7 to £6.5m by 2009/10, through organic growth in the region, notably with public sector entities. This required new business systems to integrate transaction processing, provide consistent management information and assist field operatives in their duties.

Main Business Processes



Figure 2. Main Business Processes at TPG DisableAids

TPG DisableAids' information systems were centred on three main packages – Sybiz Vision, Sybiz Vision Service Manager and Sage Payroll. Sybiz is Australian owned and was not supported in the UK very well, giving rise to upgrade, integration and performance problems. There are also multiple updates of key corporate data entities, which hampered the provision of key management information. The company has been trading for over twenty years and business processes had become well established, having been influenced by the capabilities and limitations of Sybiz Vision and Vision Service Manager (VSM) software. VSM was initially produced by a third party and was subsequently purchased by Sybiz, who have been slow to improve the product or strengthen the links between the two products. (At best, one may state that the two products are adequately linked - but in a loose manner). This has resulted in processes within the company

that are self-contained and/or highly departmental and are tuned to the operation of the software rather than the most effective and efficient method for the company. In general the main financial, sales and order processing and inventory system (Vision) has sufficient management reporting facilities, but those of VSM were poor (inaccurate and/or very basic) so are not useful indicators of performance either within their own right or in combined reports.

The development of IS Strategy

Like many family run SMEs, TPG DisableAids Ltd had little time to produce detailed business plans or vision and mission statements. The development of IS strategy was undertaken in a number of stages. An initial mapping of top-level business processes (Figure 2) was followed by an assessment of existing systems and manual processes. Existing software systems were allocated to appropriate process areas and given a provisional assessment of red-amber-green (red being in definite need of replacement, green being acceptable in the mid-term and amber in need of further investigation - Figure 3). An analysis of the current needs of the business focussed by and large on identifying products capable of providing the existing functionality as well as that which was missing from the company IS portfolio. At the same time, focus was placed on understanding why management information was often contradictory, incomplete or impossible to generate (except manually), and where key data was input into different systems. This was overlain on the process-systems map (Figure 4). Asset Management (e.g. serial numbered equipment with customers and calibrated specialist employee tools etc) was classed as missing functionality because existing methods of managing these assets were not sufficiently structured or regularly managed to constitute robust processes – manually undertaken or otherwise.

The project team spent several weeks looking at options for software upgrades or total replacement.

Wholesale replacement of existing functionality with integrated solutions (a full ERP) was seen as providing marginal benefits (i.e. 75% of the possible replacement system was currently provided in some fashion) compared with the likely resultant upheaval over the implementation period that was estimated at 9-12 months. Consequently, point solutions and integration effort was seen as providing the best solution to meet pressing business requirements whilst making good use of pre-existing software that was acceptable from a technical and strategic perspective.

Main Business Processes

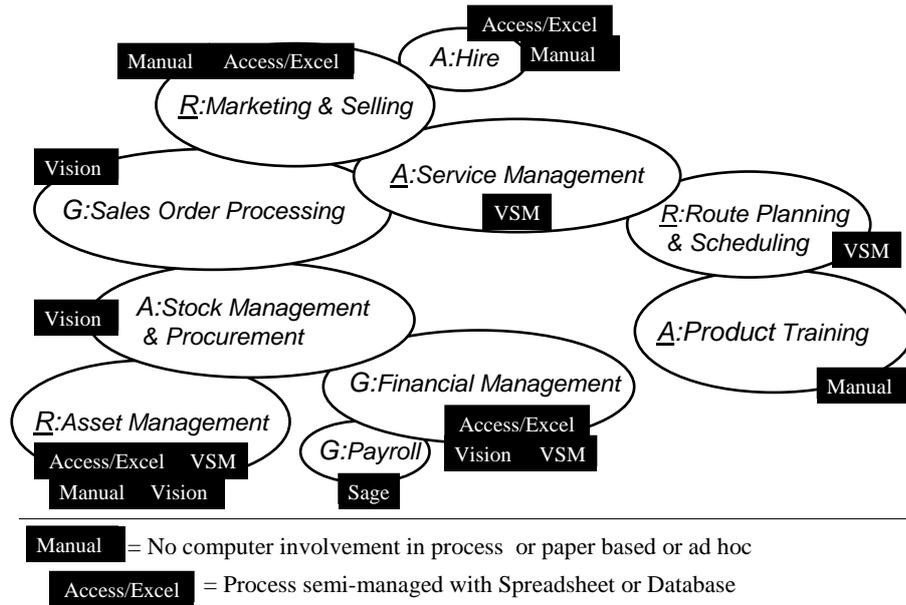


Figure 3. Existing Systems mapped to Business Processes at TPG DisableAids
 R (Red) indicates a system in need of replacement; A (Amber) indicates a system that may need replacement, subject to further investigation; G (Green) indicates a system that is sound and does not, in itself, need replacing

In October 2006, three options were presented to the company Board. The first was to retain the current software, but upgraded to the latest editions, cleanse data and fill key reporting holes (due to lack of integration, manual procedures and the absence of basic reporting facilities). This option was presented as being the cheapest short-term option but most costly in the long-term and also least likely to resolve change management issues. This option was least likely to meet the businesses plans for expansion and would provide least flexibility to the company to deal with radical changes in business needs. The second option extended the first option by adding in functionality (largely electronic document management, customer relationship management, and the introduction and integration of GPS fleet tracking) and creating new business processes for those areas of endeavour that were currently done wholly manually or not at all, due to excessive labour being required. This option was seen as mid-cost in the short term, of medium benefit short term and long term. This option would present some change management issues and uncertainty of outcome, and would introduce new functionality that was untried based on new untested processes. The uncertainty would be managed by careful phased progress with constant review and integration with other systems being achieved, before proceeding with the next add-on or point solution.

Main Business Processes

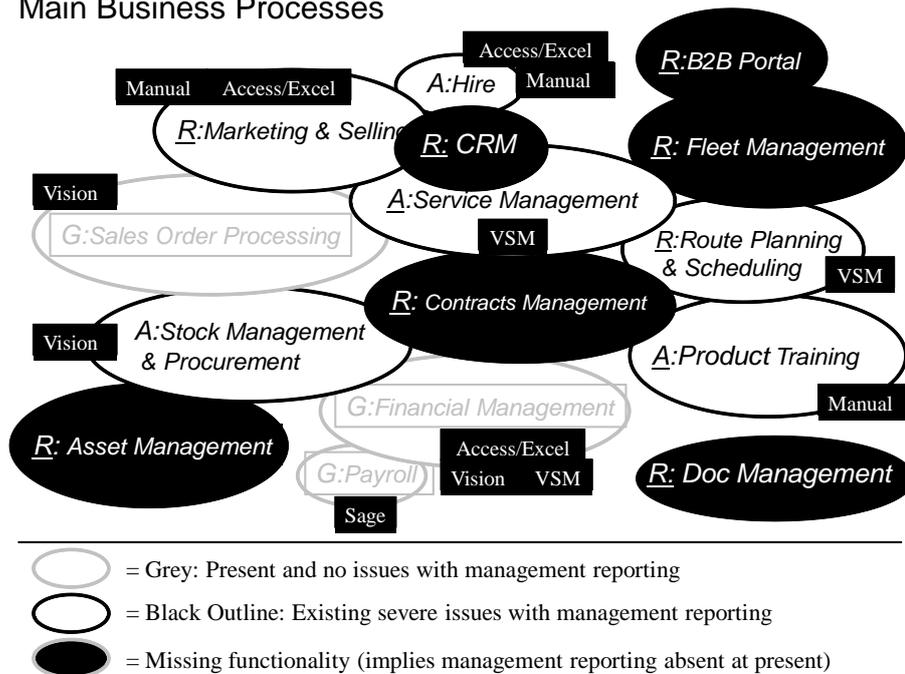


Figure 4. Missing Functionality and Management Reporting Shortfalls at TPG DisableAids

The third option was the most radical — being a wholesale replacement of the VSM package (covering a whole business department responsible for the monitoring of revenue and operating costs). Key financial and inventory systems would remain and be tightly integrated with the replacement product, which would require significant modification of existing business and affect the majority of the work force. This option would provide significant flexibility for future changes in business needs and would meet almost all of the required missing functionality. The key benefit of this solution would be to reduce operational costs and remove data entry, duplication and validation errors in multiple areas and radically improve reporting and provide monitoring of processes through workflow based systems. This option was the most expensive short term but provided the best options for future scalability and potential for incorporating and supporting business change. However, it presented significant change management issues for the whole company. All three options included sufficient bespoke integration to allow the current poor management reporting facilities to be improved and extended. The degree of improvement was proportional to the expenditure on new systems and new functionality. It was believed that the radical solution would provide a significant step-change in reporting within the company and its management at all levels.

After considerable debate and a request for clarity on the respective business cases, the TPG DisableAids Board chose a slightly modified version of the second option (that is, without asset tracking or contracts

management in the foreseeable future - Figure 5) on the basis of their intent to minimise investment at a time of uncertainty, and concern about the degree of process change required and employee's managerial and computer skills. Plans were drawn up for investment and implementation of each additional package and the necessary time and tools required were estimated on an individual basis. This approach minimised risk of outcome, and retained firm control on investments as well as putting the onus on management and people rather than technological solutions. It allowed for any cost savings in the early stages of implementation to provide investment for later phases. However, it was agreed that a further review of IS strategy would be advisable after two years.

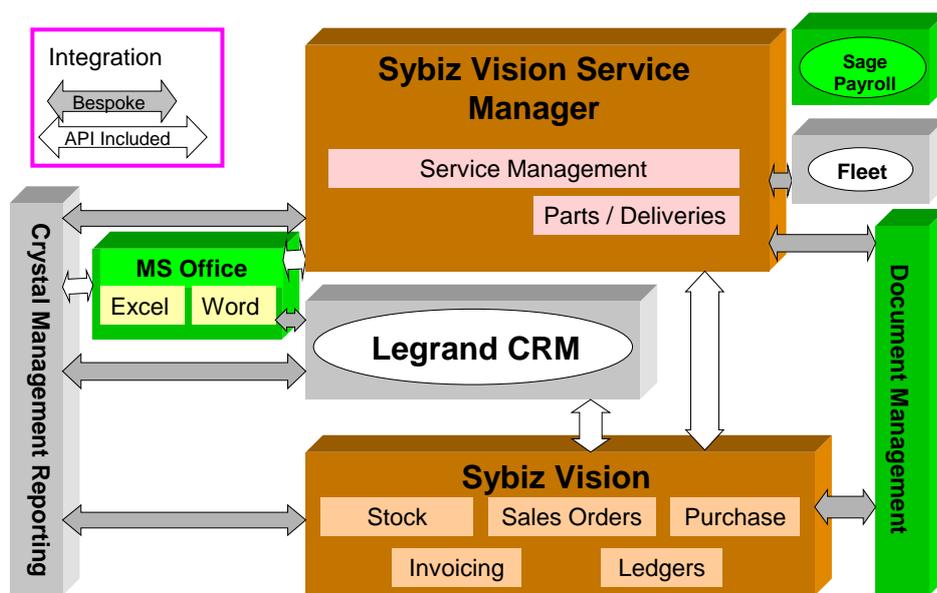


Figure 5. Selected Software Solutions at TPG DisableAids

Case study 2: Tailoring the PRINCE2 project management methodology at Allpay.net, Whitestone,

Herefordshire

Company profile and project background

Allpay.net Ltd is a small to medium sized financial services company, specializing in electronic bill payment solutions. The leading products are based on swipe card payments, Internet payments and telephone payments. The company was founded in 1996 and has experienced rapid growth over the last decade. It has built a reputable image within its marketplace, and amongst its clients. In 2007, it was listed in the Sunday

Times Tech Track 100. Turnover in the last financial year to June 2008 was £21.8 million and current staffing is 190.

In 1996 Allpay.net started providing swipe card payment facilities for revenue collection for local government and housing associations. The founder and managing director had conceptualised the idea of electronic bill payments whilst collecting rents on behalf of the council. He found it frustrating working with paper based bill payment systems and developed his ideas that technology could be used to speed up the process (Allpay.net website, 2007). This resulted in greater choice for bill payers and a more efficient way of doing business for the clients. In 1996, the company (then named Financial Collection Services) had just two clients and four staff; now in 2008, Allpay.net has over 650 public and private sector clients, and is one of the UK's fastest growing companies.

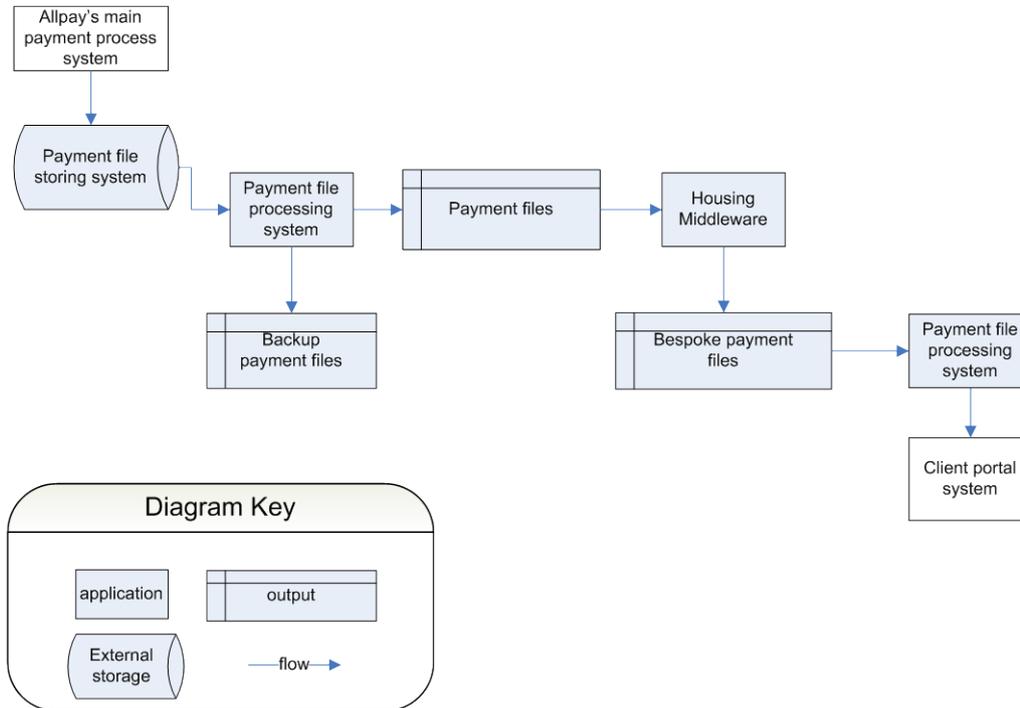
The applications used by Allpay are a core account and administration and reconciliation application, customer relationship management (CRM) system, an Intranet (Nebula), Purchase ledger, Banking and BACs transmission. The web portals, that Allpay's clients use to access Allpay's services, are termed Webconnect and Allpayments. The level of integration between the applications and systems is acceptable - the majority of systems are bespoke and therefore interfaces have been crafted in-house. This means that most of systems are robust in functionality, but suffer from inadequate integration, with bespoke but limited interfaces, resulting from a lack of overall architecture planning and design. This resulted in a disproportionate maintenance burden. In addition, because of the need to meet tight development timescales, these systems are generally poorly documented, which impedes their enhancement and scalability.

Project management of the middleware development and implementation

The KTP project aimed to enhance the services that Allpay.net provides to its key customers, particularly the housing associations and local authorities. It particularly focused on the provision of Payment Information Files (PIFs) to key customers, a process that had hitherto relied upon a plethora of bespoke files for specific customers. A thorough feasibility study confirmed that the in-house legacy systems that supported the PIFs could be replaced by a configurable, scaleable middleware product. The legacy systems transferred and manipulated data in an unwieldy way that required much manual operation and intervention. Developing a new middleware application using up to date technology would reduce maintenance overheads and provide improved software architecture (Figure 6), which would help the company deliver a more robust customer service in the mid-term.

Middleware top level structure

Tuesday, July 01, 2008



Page 1

Figure 6. Systems Architecture at Allpay.Net

The use of PRINCE2

The middleware project was an in-house software replacement project. The core project team consisted of three staff, with the KTP Associate playing a hybrid role of project manager, business analyst and software developer. Compared with many IS projects, this is a small, low profile project. Because of its scale, it would be impractical and an administrative burden to use the whole set of PRINCE2 processes, components and techniques to manage the project. From the outset, the project team resolved to adapt the methodology to fit the project scope and scale. In the main processes of Starting Up a Project (SU), Initiating a Project (IP) and Planning (PL), only a sub-set of the sub-processes were used.

In the Start Up (SU) process, PRINCE2 contains the following sub-processes:

- Appointing a Project Board Exec & Project manager
- Designing a PM Team
- Appointing a PM Team
- Preparing a Project Brief

- Planning an Initiation Stage

In the very first project meeting, the KTP Associate was appointed the Project Manager, and the Project Board was established, comprising the Project Manager, the IT Director (Executive and main user), the Systems Manager (main supplier) and University supervisor (quality assurance). Responsibilities were agreed and clearly and formally documented. A project feasibility study phase was added up front, in which it was reaffirmed that a valid Business Case existed for the project. A Project Brief was prepared, discussed and signed off, containing a formal definition of the project, highlighting its objectives and deliverables, scope, constraints and known risks; as well as formally identifying the project stakeholders. This was detailed enough to obviate the necessity of doing a Project Initiation Document later on.

Microsoft Project was chosen as the main tool to plan the project. The initial plan was drafted and the SU process completed.

In the Initiating a Project (IP) process, PRINCE2 contains:

- Planning Quality
- Planning a Project
- Refining Business Case & Risks
- Setting up Project Controls
- Setting Project Files
- Assembling a Project Initiation Document (PID)

Quality issues were discussed and documented in a published Quality Plan, which defined Quality Expectations, Acceptance Criteria, Quality Responsibilities, Standard, Control and Audit Processes and Tools. The project plan was revisited and published in more detail in Microsoft Project. As regards the Planning Process in PRINCE2, nearly all the elements were employed at some stage in the project - planning and re-planning was done throughout the project. The end product was defined and analysed, and the team identified activities and dependencies, estimating and scheduling activities. The Business Case was refined and the Risk and Issues logs were set up and initial entries made. The plan itself was circulated and discussed at weekly project progress meetings.

Once underway, a big project in the PRINCE2 environment often goes through a number of stages which are managed via three main processes – Controlling a Stage (CS), Managing Stage Boundaries (SB) – i.e. at the end of one stage and start of another - and Managing Product Delivery (MP), which focuses on different products produced within each stage. However, in this project, once the feasibility study was

signed off, there was only one main stage and thus the SB process became unnecessary; and the MP process was similarly not required as the main deliverable was the new piece of middleware - and resources, milestones and dependencies were planned and managed via the Microsoft Project plan. The Project Board met weekly or fortnightly and undertook a range of management tasks contained in the Directing a Project (DP) process. Elements of the Closing a Project (CP) process were also used in July 2008 when the project was completed, which assisted the closure of the project in a controlled manner. Confirmation of project closure was discussed and accepted at the appropriate Project Board meeting. All deliverables were reported on, and the software application was released by the Quality Assurance team, who confirmed that the software met the specified Acceptance Criteria. The End Project Report was submitted to, and accepted by, the Project Board, and further developed by Project Board members in a Final Report submitted to UK government. Additionally, meetings were held with IT Operations and end users to discuss the system's deployment; and a further meeting was held with the in-house systems team to handover documentation and agree support and maintenance arrangements.

Guidelines for PRINCE2 adaptation to the SME environment

The Allpay.net case study illustrates how SMEs can use elements of the PRINCE2 methodology to effectively control and manage their projects. A summary check-list for those wishing to attempt this for IS projects in SMEs includes:

- Focus on the selective use of the main processes – let the components and techniques be driven by need
- Build a platform for the project around the SU, IP and DP processes, which set up the Project Board and define responsibilities. Look to combine the Project Brief, Project Approach and Project Initiation Documents into one consolidated brief. Be sure to include a Quality Plan and a Business Case.
- Use a Risk Log and probably an Issue Log – but employ the other logs only if necessary.
- Use Microsoft Project as the Planning tool and thus shape the Planning process accordingly. The Product-Based Planning technique may not be required.
- If appropriate, reduce the project down to one main stage. This means you will use the Controlling a Stage (CS) process only once and will not need the Managing Stage Boundaries (SB) process.
- Only use the Managing Product Delivery process if you have to.

- Use Highlight Reports, Checkpoint Reports and Exception Reports to flag up key achievements, issues and concerns to the Project Board and other stakeholders.
- Use elements of the Closing a Project (CP) process at project end, particularly the formal involvement of the Project Board in confirming project closure. This will likely require customers' acknowledgement that acceptance criteria have been fulfilled and issues resolved. An End Project Report should be drafted to pull all project issues together for formal Board approval.

In their guidelines for tailoring PRINCE2, the OGC stipulate a minimum set of PRINCE2 elements that aligns quite closely with the conclusions reached here. The OGC (OGC, 2006) talk in terms of a 'Controlled Start', which can be a combination of the Start Up and Initiation processes, 'Controlled Progress', which may comprise one main stage, and a 'Controlled Close', in which the project manager should report on closure issues to the Project Board. These guidelines provide a useful overarching framework within which the checklist contained above can be viewed.

Case Study 3: ERP package evaluation and implementation at Fixing Point, Cheltenham

Company profile and project background

Fixing Point is a family business based in Cheltenham that design, manufacture and distribute a wide range of non-standard products of high quality, technically advanced products to the roofing, cladding and walling sectors of the construction industry. Existing legacy systems in the company had limited capability, particularly in product costing, and were not well integrated. Management information was processed by a number of standalone packages and a range of spreadsheets, across four main sites around the UK. This was labour-intensive and produced data discrepancies, which impacted on customer service. Stock management across these sites was also problematic, and resultant 'out-of-stocks' and inadequate resource capacity to meet deadlines resulted in unacceptable customer service levels.

A key issue that needed addressing in Fixing Point was the integration of order processing, manufacturing and stock control for the flashing and fabrication product group. In order to achieve this objective, Fixing Point elected to replace their legacy systems with one integrated package - an Enterprise Resource Planning (ERP) system - and re-engineer business processes to support the company's growth plans. Fixing Point wanted to establish a common platform and technical standards for IS across all three product divisions, using standard procedures and practices which would aid the culture shift to a 'one team' approach within the company. The new system needed to reduce the amount of duplicated processing and eliminate the need for

spreadsheet based control systems that were the norm. A significant improvement in the quality and availability of data was required.

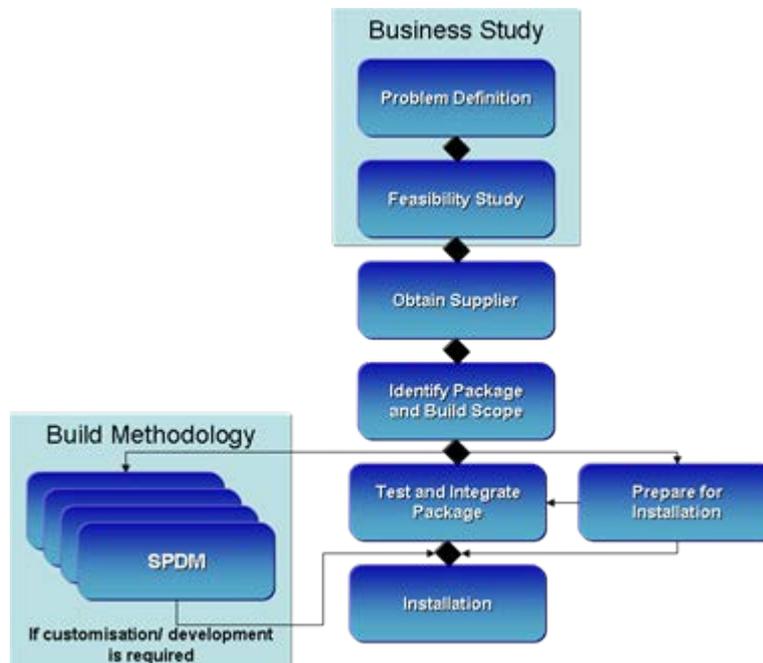


Figure 7. The PRISM Buy-Build Methodology (as used at Fixing Point)

The package selection process

Fixing Point embarked on an 18 month project to replace their legacy systems in July 2006. Getting the best ERP package was viewed as critical to overall project success, and after discussion with University colleagues, the Fixing Point project manager (the KTP Associate) recommended to the Project Board that a simplified version of the PRISM Buy -Build methodology be used for package selection (Figure 7) combined with some elements of the PRINCE2 project management methodology. This recommendation was accepted and the PRISM methodology was adopted for the package selection process.

In the Business Study stage (Phases 1 and 2 of PRISM Buy-Build), processes were mapped at a high level (as at TPG DisableAids) and key users from all four branches were interviewed to establish current and future information needs. This allowed the project team to identify issues and information gaps in the company. The findings were used as the basis for the production of key areas for improvement, key performance indicators (KPIs) and the list of user requirements for the Request for Proposal (RFP), this being part of the Obtain Supplier phase (Phase 3) of the Buy-Build method. At this stage, the project became firmly 'plugged in' to the Buy-Build methodology, which was then used for the package selection and

installation processes. In the Obtain Supplier stage, the company produced the RFP, identified and contacted suitable ERP vendors for an SME, and invited selected vendors to send proposals. This process took about 3 months in total.

In the Identify Package and Build Scope phase (Phase 4), the company short listed the proposals and selected four vendors for a system demonstration. Following the demonstrations, Fixing Point selected the final two for further demonstration and investigation, including a workshop and detailed discussion on functionality, user requirements and price negotiation. This process took a further 5 months. At the end of this phase, Fixing Point chose the EFACS E/8 ERP System from Exel Computer System Ltd. This is a component based ERP package that allows some customisation and flexibility in the way it is implemented. It is built with the latest Internet technology - AJAX (Asynchronous JavaScript and XML), and due to its Variable Component Architecture, the package can be adapted to fit specific functional requirements.

Systems Implementation

Preparation for Installation (Phase 5) was completed in 3 months. In this period, key users were sent for training on key functional aspects of the new system, and took responsibility for mapping the new system's capabilities against Fixing Point's business processes. To ensure good mapping of the system throughout the business, key users were selected from each department and across the branches. Activities that were done during this period included unit testing of the main business modules, pilot data migration of key business information, customisation of the system where business gaps existed, and a range of workshops for training, enrolment and decision making. All these activities were overseen by the Project Board.

Test and Integrate Package (Phase 6) was planned to be completed in 3 months. However, after some delays due to other business issues taking priority, this phase was completed after 6 months effort. The delays were due to unexpected internal and external factors that significantly impacted the company. For example, changes in staffing meant that key systems users were not able to complete their testing within the time frame. The Project Board elected not to rush with the implementation, but rather to ensure a high quality implementation, thorough testing and adequate training for all users to underpin a smooth transition, less staff resistance, and a successful embedding of new process change across the company. Activities in this period included further training of key users, setting up cross-branch system connections and application testing at the branches (Walsall, Glasgow, Cheltenham, Bradford); and unit testing and integration testing on all modules of the new system and pilot testing with all users. The system went fully live after a month of

parallel running in July 2008, this approach ensuring that users had ample time to familiarise themselves with the new system and associated procedures.

Pointers for SME use of PRISM Buy-Build

The Fixing Point case study illustrates how the Buy-Build methodology can provide direction and guidance to support the selection of vendors and subsequent installation processes. This method assisted in the research and selection of suitable ERP system vendors that matched Fixing Point's business requirements, company size and project budget. Significant issues that surfaced in the implementation included the assessment of vendor financial capability, and control of customisation and bespoke changes to the new system.

It is vital that selected vendors have the financial stability to ensure the success of implementation as well as a long-term relationship with the company. In this regard, Fixing Point encountered the unexpected company restructuring of the chosen vendor, and as result, the project 'go live' date was pushed back to June 2008. This also caused uncertainty in the project and at one time Fixing Point was considering reverting to the runner-up vendor. Nonetheless, since the selected company offered a more powerful, flexible, new technology and value for money solution to Fixing Point, they decided to continue the collaboration.

The basis for a successful implementation in ERP system is the good management of organisational and technical changes and this was one of the challenging factors in the ERP implementation at Fixing Point. Even though most employees welcomed the planned replacement and transition from old system to new, they were very much used to the standard style, method and business flow of the old system. Hence the difference between the new ERP system and the legacy systems triggered requests for customisation in many areas. All the requirements were seen by users as critical, but in fact most of these requests were trying to imitate the business flow of the legacy systems, rather than being necessary to support the new business model. Convincing users to adopt and adapt to the new standard and best practice required advanced management and technical skills, but the Buy-Build method provided a valid process framework within which this was achieved. Failure to control users' request for change and customisation can lead to the new system being a replica of the old, and thereby limit the new systems benefits.

CONCLUDING REMARKS

The impact of knowledge transfer

Levy and Powell (2003) have employed a model introduced by Willcocks et al (2000) to chart the business value an organisation gains as it advances its adoption of e-business and information systems. The model

identifies three organisational 'gaps' and the model can be used to highlight how the KTP projects have provided the 'bridge' to allow companies to move across these gaps and advance their exploitation of IS (Figure 8).

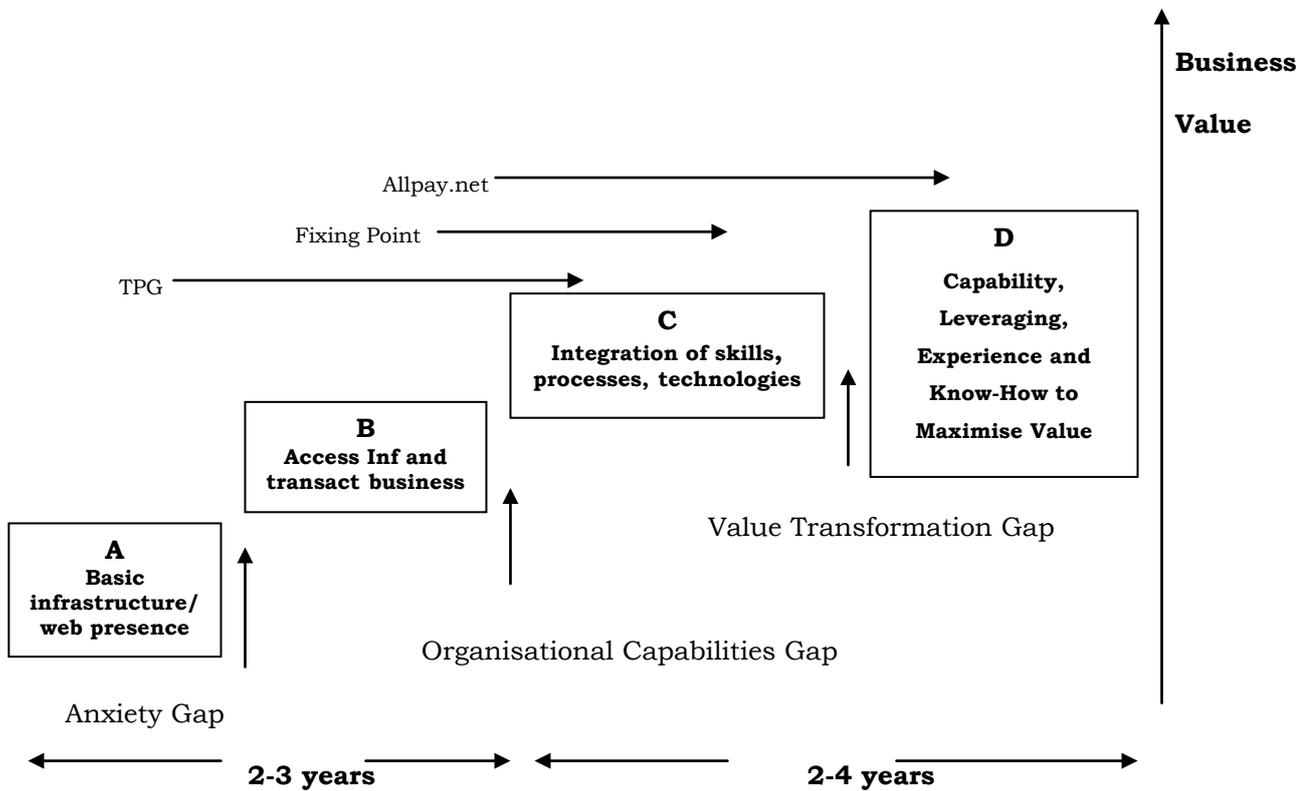


Figure 8. Willcocks et al's Model: Progress in the three KTP projects
Source: Willcocks et al (2000)

Based on personal observations over the duration of the projects, interviews and project end reports, all three projects acted as a catalyst for significant organisational and process change. TPG DisableAids bridged both the 'anxiety gap' and 'organisational capabilities' gap during the course of the project. They gained confidence in the value of increased deployment of IS, invested more, set up an IT department (with the Associate as permanent IT manager), and introduced process change in several business functions in parallel with new systems implementation. For example, as a result of investment in technology infrastructure and new software, fleet engineers and sales teams are supported by the same number of administration staff and will not expand in line with the growth in company turnover. A realistic estimate of saving is some £40K per year. Further benefits have come from the development of vehicle tracking reports that have highlighted critical issues in driver behavior and route planning. The improved ability of TPG DisableAids to respond to customers' information and collaboration requirements has numerous benefits in maintaining existing

relationships and securing new business. This has reduced the overhead on management in resolving data conflicts in the customer area and generally improved information quality for timely and effective decision-making.

The ability to track both sales and service staff has allowed the company to maximize resource utilisation and reach more destinations within a standard working day. Software improvements have allowed a tighter control on stock and a better turnover of parts held. The KTP project was also the catalyst for the introduction of a new business process relating to re-assignment of data entry duties reducing delays and errors, explicit tactics for reputation management and repeat trade, and processes providing staff monitoring and training. New internal communications facilities (information portals and internal email) enhance internal communication and information sharing. Project management has allowed more competitive pricing of larger projects aligned with a more professional approach. This gives site managers and project co-ordinators an additional confidence that other trades on site will not conflict in time or space and improves cost control.

Moreover, since the completion of the first KTP project in September 2007, the company have completed a second KTP project to deliver a new marketing strategy, and have now embarked on a third to enhance systems across the extended supply chain, with both customers and suppliers. Process change has thus carried on apace after the end of the first project, and the company are now about to cross the 'value transformation' gap and become a fully customer focused organisation. The KTP Associates at TPG DisableAids were the drivers of this change, with support from the senior management team. Training in new systems and procedures has been a steady 'drip-feed' activity as change has been introduced incrementally, as part of a carefully managed 'step-by-step' process, that was supported by an investment of £47K in new hardware, software and network infrastructure. The bottom-line impact of the first KTP project was an increase in turnover from £3.1m to £4.1m over the two year period concluding in October 2007. Margins also improved, and forecast turnover for 2008 represents a further increase.

At Fixing Point, their starting point was somewhat ahead of TPG DisableAids, as they had already bought into the concept of introducing an integrated cross-company system (ERP) in advance of the KTP project getting underway. The project focussed on building an integrated approach to systems development and process change across the company's three divisions, and a reorganisation of people and structures. The underpinning technology platform was also upgraded as the company moved across the 'organisational capabilities' gap; and since the completion of the project in January 2008, as at TPG DisableAids, the company has continued to advance in terms of process change as the new ERP has bedded in under the

guidance of the KTP Associate who also was retained by the company as IT Manager. This has required a significant training programme for 35 users of the new ERP system across four sites, and this has been carefully managed and dovetailed with on-going business activity to minimise disruption to operations. The company's operations and its competitive position have improved in a number of regards. Duplicated processes have been eliminated and errors have been reduced, and inventories can be reduced with shorter finished product lead times. Communication within Fixing Point has also improved, as all staff use one main integrated system with one set of data. The bottom line impact across the course of the project was an increase in sales of circa 8% year on year from £5.39m to £5.82m. Investment in hardware, software, consultancy and training over the duration of the project was circa £100K. Fixing Point are now very close to bridging the 'value transformation' gap, as they use the new systems and processes to focus on enhanced customer service delivery and improved margins.

Allpay.net was the most advanced of the three companies at the start of the project. Being a technology company, their IT staff capabilities were already well developed, and the company was just about moving across the 'organisational capabilities' gap when the project started. A sizeable IT/IS department was in the throes of reorganisation, which carried on well into the project with a new IT Director being appointed, at Board level, at the mid-point of the project. The KTP project was the catalyst for a review and remodelling of the company's technology infrastructure and the leveraging of competitive advantage through combining legacy systems value with new technology implementation. At the same time, practices and procedures were improved to underpin the transition to a fully customer focused company.

Key to the success of the KTP project at Allpay.net was a growing understanding of how PRINCE2 can be deployed in a small project/small company environment. The KTP project illustrated how a tailored version of the methodology could provide a viable project management framework with a set of tools and processes that can be drawn upon as and when necessary. The new middleware development deployed UML, ASP. Net, C# and SQL Server technologies, and Allpay.net now have a configurable middleware product to service payment file processing with leading clients. This will reduce overheads in the systems maintenance area by circa half a head a year (circa £20K p.a.), and lead to a significant improvement in customer service, particularly speed of implementation when new customers are engaged. This is symptomatic of a company bridging the 'value transformation' gap as the company's continued rapid growth provides experience and know-how to maximize the value of its investments in technology and become an increasingly customer focused organization. A new office building and ground floor technology centre were opened towards the

end of the KTP programme and total investment in new technology and associated infrastructures totaled £1.5m over the duration of the project. Turnover increased from £11.9m in 2005 to £21.9m in 2008.

As regards the impact on the University, these KTP projects have acted as catalysts to consolidate and extend university-company relationships in a number of regards. At TPG DisableAids, the relationship was consolidated and developed to encompass two further KTP projects, bringing in different skills and knowledge from other parts of the University. The company also featured in a commercial continuing professional development (CPD) training programme on knowledge transfer partnerships (Wynn, 2008), and the Associate has played a significant role in undergraduate lecturing on e-business strategy for the past two years. The Associates at Fixing Point and Allpay.net both studied the University's MBA course on a part-time basis and the Finance Director from Fixing Point was cited in the University's MBA assessment by the European Foundation for Management Development's Programme Accreditation System (EPAS) in December 2008 and provided evidence as to the business value of the degree. The Associate at Fixing Point has also lectured at the University, and the Associate at Allpay.net has supported the University in its dealings with Chinese delegations. A number of undergraduate student projects were undertaken at all three companies and the expertise developed and transferred via the KTP was made available to other companies via additional KTPs focusing on similar themes. In summary, these projects have enriched the University's engagement with industry, have enhanced its teaching capabilities and supported its advance to being a modern 21st century university with an international presence and outlook.

The development and implementation of IS strategy

It is easy to spend many months at the start of IS projects in researching current processes and systems. To cut through the possible lack of focus that can come from employing too many methodologies and models, the experience of these projects can be distilled into a set of guidelines to get SMEs embarked on a new IS strategy.

An understanding of the company business plan and the key objectives for the next 3-5 years is important, but there is not normally a need to delve further unless the company is undergoing a major change of direction. It is useful to identify main business processes (Step 1 in Figure 9) as a framework for mapping



Figure 9. IS Systems Strategy Development (and options evaluation)

systems and also as a point of reference should any significant business improvements or changes in procedures be required. The mapping of the current systems portfolio (Step 2) is a key step in evaluating what is strategically sound, what is missing or needs replacement, and what lies somewhere in between – possibly redeemable, but possibly to be replaced. This can usefully be done by mapping systems to business processes and starting to apply a simple Red-Amber-Green (RAG) assessment of main systems and applications (Step 3) as was done at TPG DisableAids. This can be done in discussion with management, systems operatives and other staff. These are simple but effective tools in developing and communicating strategy elements and should feature in senior management or Board meetings when final strategy decisions are made.

Step 4 focuses on data issues. It is possible to spend a great deal of time and effort in establishing what data is used where, and what information is needed to support future company requirements. This can produce a welter of data analysis and corporate data models at various levels. If one takes it as read that the systems solution will focus on packaged software (rather than bespoke), then much of this analysis can be left out at this stage, and returned to as and when circumstances demand. It is useful to establish in which systems the main corporate data entities (normally customer and product data) are entered and updated, and if there are any significant data duplication problems caused by multiple data entry in different systems. This will be

of value when evaluating software packages in highlighting where data maintenance issues have to be addressed. It is also useful as a top-level guide for data cleansing and migration to new systems down the line. A second activity of value at this stage is to re-interview key managers and decision-makers to get a top line view of their current and future information needs. This can be done using a spreadsheet or simple questionnaire and can be fed into subsequent package evaluation. Information needs can be linked to Critical Success Factors (CSFs) or Key Performance Indicators (KPIs) if these are known at company or departmental level.

Whilst undertaking the above analyses, it is useful to spend some time looking at the relevant software products on the market and to talk to key suppliers. This can give a stimulus to new thinking – until you know what is available, you might not realise what could be of benefit to you. Discussions with software suppliers are important to understand their product development strategy, what functionality will be in their next software releases, what their underlying database strategy is, and what commercial arrangements and technical links they have with other software vendors. All this can help develop and shape future software options (Step 5). The Buy-Build methodology deployed at Fixing Point can be used at this stage as a framework for package evaluation and selection.

It is advisable to identify two or possibly three main options for consideration at Board level. Unless, the Board has already elected to adopt an ERP route, options are likely to include one or more point solutions to complement existing packages, and a low cost option that focuses on package upgrade, data rationalisation and improved integration and reporting, as well as a higher cost option in which the bulk of existing systems are replaced with an integrated package from one vendor. All options need to be fully thought through and costed and a clear business case made for each with benefits and payback periods (Step 6). The Business Case is a key document that will be revisited many times throughout a project life cycle. It is important that the Board make and 'own' the Business Case, and understand the full implications of the strategy chosen. This may not always be straightforward, as putting in new systems often causes significant upheaval and changes in working practices. All this needs to be made clear and weighed up in the final decision. Once the IS strategy has been authorised at Board level, a phased implementation plan or roadmap needs firming up (Step 7), and this will likely need to be re-presented for more detailed investment approval.

Once underway, there are a number of other guidelines that can be distilled for successful implementation of systems strategy. These include the following:

- Don't follow any systems development or project management methodology slavishly – in an SME, only selected components are likely to be appropriate as illustrated by the adaptation of PRINCE2 and PRISM highlighted above.
- Make sure the Board and specific sponsors from senior management are kept 'in the frame', and continue to identify with project objectives, costs and benefits. This can be done effectively by ensuring main Board members are actually on the Project Board.
- Don't allow over-elaboration on process change issues. Force the pace and guillotine this activity if it threatens project timescales.
- Restrict package customisation to the absolute minimum.
- Get budget approval in stages and build in contingencies for tasks that are difficult to estimate e.g. data issue resolution, bug fixing and training
- Accept there will be difficult periods in projects of this nature and communicate and celebrate successes and key milestones when they occur.

The case studies contained in this article show how the Knowledge Transfer Partnership scheme can be used to bring new knowledge and experience to bear in the information systems arena in SMEs. This has proved particularly valuable in companies like TPG DisableAids and Fixing Point, where hitherto there was no formal IT/IS function. The transfer of knowledge has been such that both these companies have embarked on new strategic directions in the deployment of IS, and the use of PRINCE2 at Allpay is also being expanded and reinforced in other IS projects. The achievement of the KTP scheme was recognised by Lord Sainsbury in 2007, when he recommended a doubling of KTPs nationwide and concluded that 'by almost all measures, we have seen a dramatic increase in recent years in the amount of knowledge transfer from British Universities' (Sainsbury, 2007). This article has attempted to illustrate one small part of this success story, in the development and implementation of IS strategies in three SMEs.

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