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## Developing and Implementing IS strategy in SMEs

By Martin Wynn

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### **Abstract**

#### Purpose

To further understanding of how IS strategy is developed and implemented in SMEs.

#### Methodology/approach

Eight case studies, each one covering an 18-24 month time span. Qualitative research based on first hand experience (action-research), interviews, meeting minutes, Board papers, final reports. Earl's model of IS strategy development is used as a framework for assessing strategy development and implementation.

#### Findings

All three approaches identified by Earl are valid, depending on business context. All eight companies have been successful in their IS investment, some showing significant bottom-line benefits.

#### Research Limits/Implications

Shows value of properly managed IS strategy deployment in SMEs. Should encourage SMEs to adopt mid to long term approach to IS, linked to business plan. Models for IS strategy development and alignment could be progressed in subsequent research, focussing on some of these company projects and others just starting

#### Practical Implications

Case studies provide real life examples of IS good practice in SMEs. Cases can also be used as 'benchmarks'. Supports alignment of IS strategy with overall business strategy. May encourage other companies to explore use of KTP scheme for IS strategy deployment.

#### Originality/value

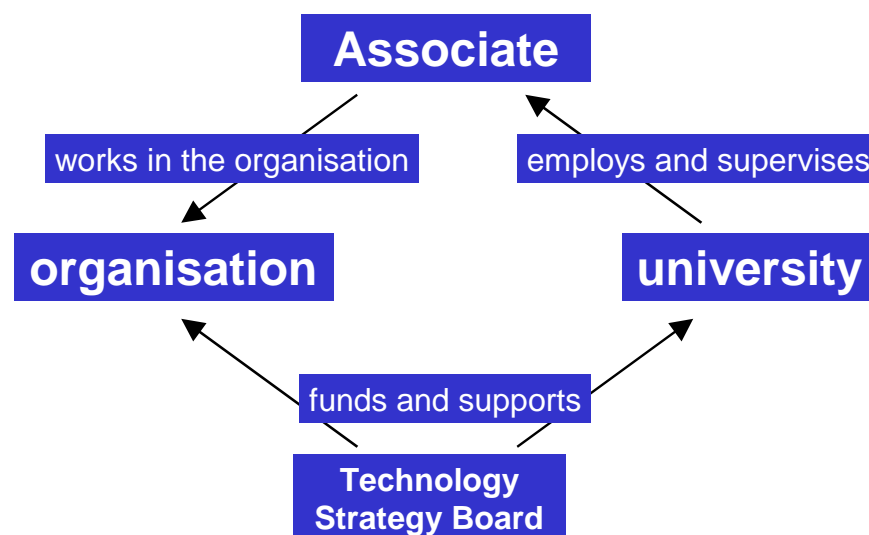
The case examples are original and have not been studied before. Strategic options, key decisions, product selections and benefits gained are of value as examples to senior management and IS professionals in industry. Provides examples of how KTP scheme operates.

Key Words: Information systems, strategy, SMEs, knowledge transfer

Classification: Research Paper

## ***Introduction***

Many SMEs are now at a crossroads in terms of Information Systems (IS) strategy. Their dilemma is whether to continue to limit investment to piecemeal additional systems and infrastructures as their business expands, but still suffer the problems of non-integration, lack of consistent management information, and restricted exploitation of e-business opportunities. One alternative is to invest significantly in new IS to support mid and long-term growth and profitability aspirations. This report summarises the results of eight discrete projects to upgrade or replace information systems in small to medium sized enterprises (SMEs). These projects lasted between 18 months and two years, and were carried out by project managers working for the University of Gloucestershire Business School, under the auspices of the Knowledge Transfer Partnership (KTP) scheme. This scheme provides UK Government funding to allow graduates (or 'Associates' as they are known) with several years experience to lead major strategic projects in industry. The scheme can be viewed as a partnership between the University, the partner company, the Associate and the UK



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

Government's Department of Innovation, Universities and Skills (DIUS), who provide over 50% of the operational project budget through their Technology Strategy Board (Figure 1). Eight different project managers were used to lead these IS projects, with in-company supervision provided by an appropriate line manager (this being the Finance Director in five of the eight companies). The projects focussed on systems replacement and process change but also involved on-going support and upgrade of the IT/IS infrastructure. The author provided external project direction and support in all eight projects.

### ***SMEs in the UK***

The Commission of the European Communities defines SMEs as enterprises with fewer than 250 employees and a turnover of no more than 40 million euros (£27.6 million) or an annual balance sheet total not exceeding 27 million euros (£18.6 million). The Small Business Service (SBS), an agency of the Department of Trade and Industry (DTI), reported that there were 4.3 million business enterprises in the UK in 2005 (DTI, 2006), of which nearly all (99.9%) were SMEs. The SME sector produced over 51% (£1.22 billion) of total company turnover, and employed 12.9 million people.

Management information systems are generally not well developed in SMEs (Premkumar and Roberts, 1999), and the introduction of IS into SMEs has tended to be piecemeal and fragmented, lacking an underpinning technology framework or link to broader business strategy (Foong, 1999). The companies studied in this paper were typical of this profile, generally lacking any centralised IT function at the start of the projects. In terms of Nolan's classic model of the evolution of the IT function in organisations, the majority of companies were at the 'contagion' stage, where rudimentary information systems had been introduced by end-users without any overall control or coordination (Nolan, 1979). There had usually been piecemeal investment in one or two standalone packages (for example the Sage accounting package or a contact database). Key corporate data items – notably customer and product information – were often entered into more than one system, with resultant problems with data duplication and inconsistencies. End-users had developed their own spreadsheets and databases (normally in Microsoft products), often compounding the

problems of data inconsistency and exacerbating the difficulties in providing timely accurate management information.

Levy et al (2001) have identified competitiveness and the importance of customer power in determining the way SMEs use IS, and Levy and Powell (2003) also conclude that 'a major barrier to the use of IS to support innovation is the leadership and technical knowledge of the owner and/or management team'. This is of relevance to the case studies included here, because the KTP Associates, supported by the academic supervisors, provided a new infusion of ideas and knowledge to kick-start the IS strategy development process.

### ***Research Method***

When the eight companies in this study were first approached, they all lacked a clear IS strategy. The development and implementation of a systems strategy became a central objective of the KTP projects. In this context 'systems strategy' focused on the selection and implementation of packaged software, and the provision of management information from data contained therein; and on the remodelling of core business processes as new software was implemented.

Michael Earl put forward a 'three-pronged' model for IS strategy formulation and delivery that remains one of the standards in the analysis of IS strategy development (Earl, 1989). It is this model that is used as the overarching framework for understanding how the companies developed their IS strategies. Although many see his three possible strategies as alternatives, Earl in fact argued that all three can be used in parallel and that different strategies suit different business contexts. This depends on a number of factors including the nature of the basic IT infrastructure, the structure of the organisation and the level of development of the organisation's main business systems. Earl suggests that a combination of strategy approaches is necessary, because in practice, senior management have three main issues to address in the management of IS:

- The clarification of business needs and their translation into information systems requirements ('top down')
- The evaluation of current information systems provision ('bottom up')

- The identification of innovative uses and opportunities afforded by IT/IS ('inside out')

The **'top-down' approach** is driven by a formal attempt to match IS investment with business needs. It identifies the business plans and goals, and then applies an analytical approach to identify information systems requirements. Critical Success Factors (CSFs) can be used to establish information and systems needs. It ensures business managers are involved in IS strategy formulation, which is thus driven 'top-down'. The **'bottom-up' approach** is an evaluation of the capabilities of information systems currently in place. As Earl says 'IS strategies are rarely developed from a green field site, but have to recognise the strengths and weaknesses of the current applications portfolio' (Earl, 1989). This may establish that some of the existing systems could be better exploited for strategic advantage or be improved upon to produce 'significant added value'.

The **'inside-out' approach** attempts to 'identify opportunities afforded by IT/IS which may yield competitive advantage or may create strategic options' (Earl, 1989). Earl argues that although 'top-down' and 'bottom-up' approaches can give indications of how IT/IS can provide competitive advantage, they will not provide the entire picture. A third approach is necessary, and Earl suggests a number of ways in which this can be pursued for 'spotting and implementing strategic advantage IT opportunities' (Earl, 1989). This includes such things as harnessing the perspectives and knowledge of sales and purchasing managers who may be field based and thereby see opportunities through their interface with customers and suppliers; and the recruitment of 'bright spark' staff that have had exposure to the latest IT/IS innovations and recent thinking on related concepts.

An analysis of the software package selection process attempts to answer the following research questions:

<b>Company</b>	<b>Sector</b>	<b>Start Turn Over (£m)</b>	<b>End Turn Over (£m)</b>	<b>Staff</b>	<b>Dominant IS Strategy (after Earl)</b>	<b>Software Packages selected</b>	<b>Profit Increase (£K p a)</b>
<b>Dowty Propellers 2004-2006</b>	<b>Aerospace Manufact- uring</b>	<b>27.0</b>	<b>40.0</b>	<b>181</b>	<b>Top Down</b>	<b>Syteline ERP package implemented plus integration with SAP Financials</b>	<b>90</b>
<b>Pegasus Retirement Homes 2003-2005</b>	<b>House- building, sales &amp; marketing</b>	<b>12.2</b>	<b>31.7</b>	<b>39</b>	<b>Top down/ Inside Out</b>	<b>New CRM package plus Virtual Private Network (VPN) and wireless technology in sales offices</b>	<b>950</b>
<b>Beacons Business Interiors 2004-2006</b>	<b>Office design, furniture assembly, project manage- ment</b>	<b>6.9</b>	<b>11.0</b>	<b>48</b>	<b>Bottom up</b>	<b>Upgrade Goldmine CRM and Sage Financials. Add bespoke reports and interfaces developed in Visual Basic Applications. Rationalise data structures. Future ERP options evaluated.</b>	<b>800</b>
<b>Fixing Point 2006-2008</b>	<b>Roof materials manufact- ure</b>	<b>6.8</b>	<b>7.4</b>	<b>55</b>	<b>Top Down</b>	<b>EFACS ERP package is being implemented in the company's three business divisions.</b>	<b>66*</b>
<b>Brecon Pharmaceuticals 2003-2005</b>	<b>Pharma- ceuticals packaging</b>	<b>5.6</b>	<b>10.7</b>	<b>270</b>	<b>Top Down</b>	<b>EFACS ERP package plus point solutions for Document Management, Label Printing &amp; HR/Payroll.</b>	<b>720</b>
<b>Building Solutions 2005-2007</b>	<b>Buildings and repairs</b>	<b>4.8</b>	<b>6.5</b>	<b>75</b>	<b>Top down/ Bottom up/ Inside Out</b>	<b>Union Square CRM plus Conquest Estimating package and Sage Financials Upgrade</b>	<b>74</b>
<b>TPG DisableAids 2005-2007</b>	<b>Equipment for disabled &amp; elderly</b>	<b>2.9</b>	<b>4.0</b>	<b>45</b>	<b>Bottom up/ Inside out</b>	<b>New field engineers tracking system (Tracker) plus CRM pilot (LeGrand). Major upgrade to Sybiz Vision (Financials and Service Management) New management information reporting capabilities (Crystal reports). Retain Sage Payroll.</b>	<b>67</b>
<b>C&amp;G Services 2005-2007</b>	<b>Training and consultancy</b>	<b>1.2</b>	<b>1.5</b>	<b>28</b>	<b>Top down/ Bottom up</b>	<b>Course Booker package plus web portal for CRM plus Sage Financials upgrade</b>	<b>20</b>

\* The Fixing Point benefits are a pre-project estimate. The end project Final Report will take place later in 2008, when project benefits will be re-assessed.

*Table 1 The eight companies in the information systems research project*



1. What different IS solutions and strategies have been pursued? Do these coincide with Earl's three-pronged model of IS strategy development?
2. What were the key issues and influencing factors in deciding which strategy to pursue, and in particular whether to adopt an ERP solution?
3. Has IS strategy been successful in its declared objectives? What have been the benefits?

The research is based on eight in-depth case studies, each one undertaken across a different 18 month – 2-year period since 2003 (Table 1). Case studies are particularly appropriate when theory is not well developed, and the use of multiple cases helps to ensure that conclusions are based on comparable outcomes and common patterns rather than generalized from what could be one-off chance occurrences (Eisenhardt, 1989). The KTP Associates were the project leaders, supported at each company by the academic supervisor and company line manager, and a broader Project Board (Local Management Committee) including representatives from the Department of Trade and Industry (now superseded by the DIUS). Evaluation is largely qualitative, based on interviews, minuted project reviews, Project Board meetings, Company Board meetings and Project End (Final) Reports. As Yin (2003) has pointed out 'a case study is an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident'. This is particularly relevant for the purposes of the present study, which is concerned with exploring the processes and outcomes relating to information systems strategy development and deployment.

## ***Findings***

### **IS solutions and strategies (research question 1)**

The case studies suggested three different solutions in terms of package software selection, which formed a key component of information systems strategy development and implementation.

*Full ERP implementation* - Three companies (Brecon Pharmaceuticals, Fixing Point and Dowty Propellers) elected to implement a full ERP system, replacing existing computer and manual systems with an integrated software suite from one main supplier. Even in these instances, however, the ERP covered circa 80% of the functionality required, meaning that some other applications from different sources or suppliers were required.

*Exploit current systems*: BBI focussed initially on 'quick wins' to exploit the information it already had in its corporate systems, and then, having reviewed the costs and benefits of a full ERP solution, decided to continue the 'quick win' strategy and defer any major new investment in packaged software.

*Selective Package Acquisition*: Three companies (Building Solutions, C&G Services, Pegasus) examined the options available in terms of ERP solutions, but elected instead to acquire point package solutions where they were most needed and could deliver most business benefit. TPG DisableAids initially followed a similar route to BBI, investing in a field engineers fleet tracking system (Tracker) to deliver quick wins through improving management information reporting and analysis (Wynn et al, 2007). They subsequently upgraded their core financial and service management system (Sybiz) and are also now piloting a CRM package (Figure 2).

These three solutions fit closely with the 'top-down', 'bottom-up' and 'inside out' approaches to IS strategy identified by Earl. The KTP initiative gave all companies the opportunity to start with a new 'top-down' approach to IS strategy development, which three of the companies pursued to select and implement a new ERP suite. The other five companies, however, favoured a shift towards a 'bottom-up' and/or 'inside-out' approach, once the cost-benefit case for ERP was assessed in detail.

This was particularly evident at TPG DisableAids where three separate IS investment plans were presented to the Board in January 2007, each with its own cost-benefit case. The Board decided that the business case was not strong enough to invest in significant replacement software, but rather elected to move to new versions of current systems and

invest in Crystal reporting to improve management information. At the same time, the case for a new CRM system was to be reviewed following the initial pilot.

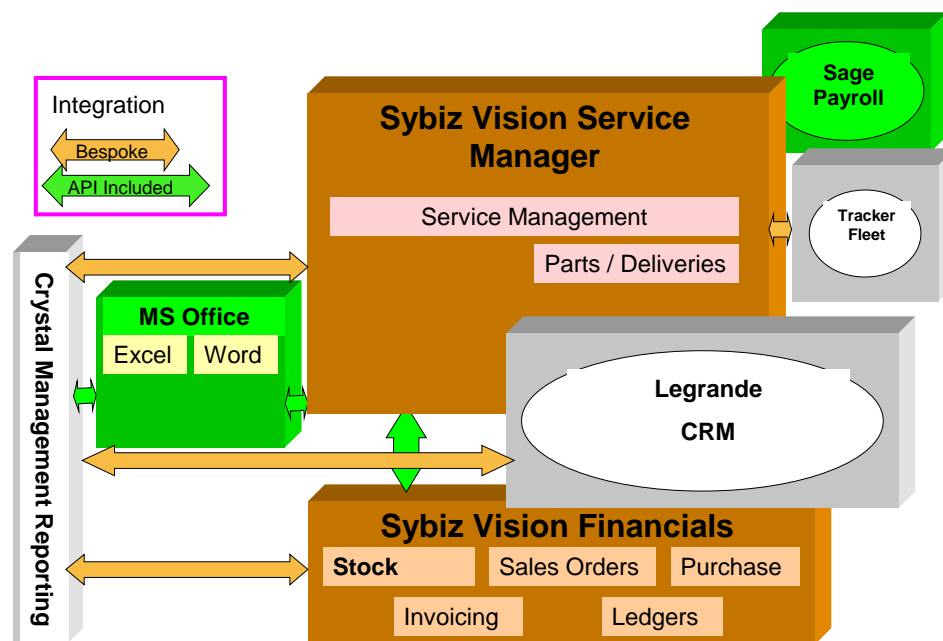


Figure 2. Software systems at TPG DisableAids

### Influencing factors regarding ERP adoption (research question 2)

The three companies that adopted an ERP strategy did so for different reasons. Dowty Propellers has less than 200 staff, but the company was, at the time, part of a larger group of companies (Smiths Aerospace) and thus not really an SME at all. However, it was included in the research set to illustrate certain aspects of IS strategy development. As the project was implemented, Smiths central services established a long-term strategy of migration to the SAP ERP product for group companies. This established a clear strategy that allowed for interim alternative ERP products in some Group companies. The SAP Financials module was to be used across the Group, with interfaces to these other ERP products. The pre-existing package (Fourthshift) at Dowty Repair and Overhaul was not amongst those packages that would be supported as an interim solution. However Dowty's sister company – Dowty OEM – was using a product that was on the short-list – the Syteline ERP. This was a strategy determined by corporate policy at a higher level and constrained by the realities of

what was supportable across the Group. The migration to Syteline delivered significant benefits in the integration of the two Dowty company information systems, and also allowed effective financial reconciliation and reporting at Group level via the SAP Financials module. Brecon Pharmaceuticals were a large SME (with circa 230 staff in 2003) with clear intent to drive through their rapid expansion plans. They had invested relatively little in packaged software and many of their systems and procedures were still manual or built around end-user spreadsheets. For both these reasons, the decision to invest the time and effort in an ERP project was taken more easily than in the smaller family businesses discussed below. Another important factor was the regulatory environment in the pharmaceutical industry, which demanded high standards regarding traceability, packaging and laboratory trials. The product traceability functions of an ERP package are valuable in this business environment. It is also interesting to note that within 6 months of the completion of the ERP project, the company was acquired by a large international healthcare group (AmeriSource Bergen), and one of the reasons cited for the acquisition of Brecon Pharmaceuticals was its excellence in systems and practices.

Fixing Point, with a turnover of circa £7m per annum, has three distinct business units, each specialising in different product areas linked to the roofing and fixings industry - roof support systems, the provision of fixings and accessories, and the flashings and fabrications business, a total market of circa £121 million in the UK. To support continued growth, the company set a strategic priority to get all three divisions operating on one common information system platform, using standard procedures and practices for core business activities. This was particularly important in the costing of the company's different products, which had been done through a range of legacy systems that produced inaccuracies and were difficult to support. A new company wide ERP system was required to provide a common framework for the company's future information processing and reporting. After a thorough evaluation of options available on the market, the company chose the EFACS package, which is currently being implemented. It is of interest that this is the same package selected by Brecon Pharmaceuticals.

As regards the other five companies, there is a range of issues that dissuaded these companies from taking the step into ERP software.

- *Concerns over the manageability of ERP implementation* – both BBI and TPG DisableAids were concerned about the scale of an ERP project. Both companies have less than 50 staff each and implementing ERP was seen as likely to cause significant upheaval for more than a year, not just because of the new software and associated training, but because of the need to change working practices significantly and redeploy staff. Several companies expressed a preference for a staged, module-by-module, approach to putting in new software. This can be done with individual packages or point solutions, but the perception is that this is not so easily achievable with ERP.
- *Doubts about the functionality of ERP packages* – even if a phased implementation of ERP were possible, several companies had major issues regarding package functionality compared with individual point solutions. This was particularly the case at Building Solutions, where the company had already implemented the Sage financials package, and seriously considered the CRM and estimating packages from the same supplier. In the end, however, the functionality of an alternative CRM package (Union Square) led the company to adopt a ‘best of breed’ approach to package acquisition (Figure 3).
- *The attraction of ‘Quick Wins’* - the business culture in SMEs is often cost conscious and a clear return on investment is expected. This leads to a search for ‘quick wins’, which are valuable, but which eat into time and resource available for a full evaluation of options and full cost-benefit analysis. It is unlikely ERP will be chosen unless the ‘space is made’ for a properly managed evaluation of options.

- The need to *maximise the benefits of current investment and skills*. At BBI, company funds and staff time had already been invested in the Goldmine CRM product, and



Figure 3. Software Packages selected at Building Solutions

senior staff were reluctant to move away from it, even if there were problems of integration with other packages. At TPG DisableAids, the Sybiz accounts package had been used for some years, and a service management module from the same supplier had also been purchased. There were significant problems with functionality, support and integration, but the company elected to attempt to address these and maximise benefits from systems already in place, rather than sweep them away and invest in a new ERP.

- *Cultural influences impact on decision-making*. Family businesses (such as TPG DisableAids, C&G Services, Fixing Point) are 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. This is likely to mean that the business case must be absolutely cast-iron and water tight before family board members will agree to any significant spend on new systems.

### **IS strategy benefits (research question 3)**

Each of the KTP projects had clearly stated financial objectives, and this facilitates an assessment of the quantifiable benefits of IS strategy implementation. The general picture is positive with several companies delivering significant bottom-line improvement over the two-year period. The majority of companies attribute some of this growth to their new information systems platforms (Table 1).

At Pegasus Retirement Homes, a combination of a new CRM system (run by a third party outsourced agency) and sales force automation provided the technology platform for spectacular corporate growth, with minimal increase in support overheads. Company turnover grew from just over £10m in 2003, when the project started, to over £40m in 2006. Investment in new software, the Pegasus network (employing VPN) and wireless technology totalled £250,000. This allowed Pegasus to employ an expanding sales team managed by the same number of managers and administration staff. A realistic estimate of savings was put at circa £150,000 per year. The new systems increased the rate of sale through enhanced CRM capability and improved communication to staff and customers. Fifty percent of Pegasus employees are based away from the office and the company depends on effective communication with staff and its business partners as a core business process. The retirement housing market is set to expand from 9.4 million in 2001 to 12 million by 2011. Steve Hughes, Director of Business Resources at Pegasus, noted that 'as a result of the new CRM system, it is reasonable to expect an increase in the rate of sale equal to approximately one unit per site per annum. For ten sites, this would yield an extra £800,000 gross profit per annum. As the number of developments for sale increases, then this figure will increase accordingly.' (Wynn and Jones, 2006).

Pegasus Retirement Homes combined a 'top-down' and 'inside-out' approach to IS strategy development. However, similar scale benefits were achieved at Brecon Pharmaceuticals with a clear 'top-down' assessment of what was required to support the 5 year vision, and at BBI, where the approach was initially 'top-down', but soon became strongly 'bottom-up' as pragmatism and cost control brought a clear focus on extracting all possible value from existing IS investment. At Brecon Pharmaceuticals, planning abilities are extremely important and none of the company's competitors had the level of sophistication for capacity planning brought in with the new ERP system. Quantifiable benefits included headcount savings in production, QA, warehousing and finance, which delivered £80K saving per annum (4 staff). The increase in cubicle utilisation in packaging brought about by improved scheduling and production planning was quantified as a hard benefit of £640K per annum (Wynn and Maldonado, 2007).

At BBI, the annual sales turnover increased from £6.9m in 2003 to £11.0m in year ending May 2006. This growth has been supported by improved information to allow better customer service and quicker response to project costing enquiries. It also required an improved all round use of modern technologies by staff both at HQ and those working in the field. The new reporting systems and associated 'quick wins' were judged central to achieving these improvements. More effective processes have allowed significantly improved cash flow. A quantifiable bottom-line benefit of £800K was attributed to the project by the Finance Director in evaluation of the project.

The fact that different approaches to IS strategy development delivered significant benefit supports Earl's view that no one approach is better than another, and that all three approaches can be used depending on company circumstances. This is borne out at Building Solutions, where a new CRM system (Union Square) and Job Estimating system (Conquest) were implemented in January 2007 (Figure 3). The company has combined all three of Earl's approaches over the past two years in evolving its IS strategy. Several improvements in business efficiencies have already been achieved. Remodelling of the



cumbersome purchasing procedure has enabled a reduction in costs, as has the upgrade of the basic technology infrastructure to a faster, server based modern network. This has reduced the reliance on paper-based systems. One example is the wasteful procedure that

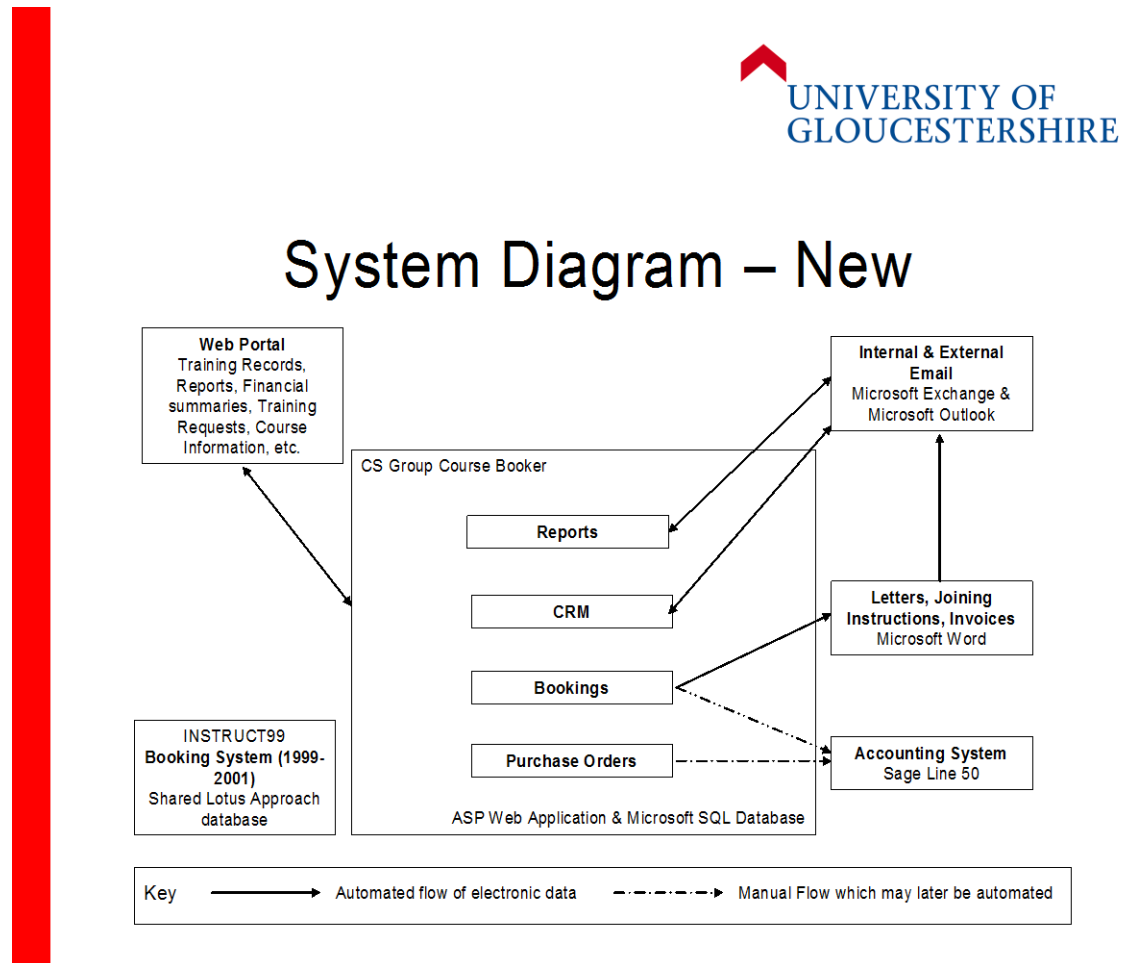


Figure 4. Systems Diagram at C&G Services (Europe)

The old Booking System (INSTRUCT99) will be retained in the short term to access old records.

was used in dealing with an enquiry. Plans & specifications were received in paper form and then needed to be copied and distributed to a large number of sub-contractors. Substantial savings are being made by dealing with these electronically. A target saving in costs of 5% has been set. The absence of a link between the estimator's quantities and the materials/resources ordered by the site brings about a potential for over-ordering. Whilst the company has good storage facilities and a policy to use surplus materials, there is an opportunity to reduce waste by the implementation of this project. A target of 3% has been

set, and the company estimates at least a £65K bottom-line project benefit per annum in future years.

### ***Concluding Remarks***

In addition to the quantifiable benefits noted above, all eight projects acted as catalysts for organisational and process change, irrespective of which type of IS strategy was implemented. For example, at C&G Services, the KTP project was the catalyst for significant changes in working practices and attitudes to information and systems. Staff were trained as key users who took ownership of information provision and keeping data up to date and customer relevant. The examination of all processes and systems caused the directors to revisit the efficiency of all tasks. The selection of a new CRM system (Figure 4) and its implementation also focused the staff on better ways of delivering their service. A variety of processes relating to the new systems procedures were remodelled making them more efficient. This has contributed to an analysis of new training products and capabilities and has given the management a new impetus to broaden the scope of their customer services with key clients through the new web portal.

Based on personal observations over a two year period, interviews and project end reports, it can further be argued that at least two companies – Pegasus and Dowty – went beyond improving organisational capabilities to encompass business transformation in the course of their KTP projects. At Pegasus, the KTP project strengthened the outsourced business model pursued by the company, and energised the sales team to use technology to increase unit sales and reduce administrative overhead ratios. At Dowty Propellers, the move to the Syteline ERP allowed compliance with the Group decision to implement SAP as the main financials package, without this representing a challenge to the individual businesses, and hence sacrificing profitability, transparency and internal control. An integrated systems strategy - instead of discrete, project-based activities managed as separate functions in various silos – enabled the company to achieve agility and drive revenue and competitive advantage across the Group, enhancing productivity and ultimately optimising business

performance. Integrating the two Dowty businesses via the one IS technology, with a single platform, allowed the organisation to reduce its complexity and obtain more business value from their IS investment, by allowing the Repair and Overhaul business to be included in the SAP roll out. Running in parallel with this technology standardisation was a re-engineering of business processes that recognised the Aftermarket and Original Equipment Manufacture value streams.

This research has shown that no one strategy in Earl's model is likely to produce better results than the other, and that different strategies will probably be used in different business contexts across a number of years. SMEs will be looking for value and visible delivery. The challenge and opportunity for ERP vendors is to sell-in modules one at a time, and allow SMEs to build an integrated software suite over a number of years, following an agreed technical and/or product supplier policy. Most SMEs will resist the 'big bang' approach to systems replacement because of the cost and upheaval this causes in company activities. However, these cases show that the level of benefit that can be attained from significant new IS investment can provide a rapid payback and a sound technology platform to support future corporate growth. It is the overall success of these projects that is the main conclusion of this research, that should be an encouragement to other SMEs to advance their IS strategy development in similar fashion, with or without the benefits and guidance of the KTP scheme.

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