UNIVERSITY OF GLOUCESTERSHIRE
at Cheltenham and Gloucester

This is a peer-reviewed, post-print (final draft post-refereeing) version of the following unpublished document and is licensed under All Rights Reserved license:

Wynn, Martin G and Shen, R and Brandao, Raul (2008) Managing IS projects in SMEs – Tailoring the PRINCE2TM1 methodology. In: Conference on Money, Economy and Management, World Business Institute, July, 2008, Imperial College London. (Unpublished)

EPrint URI: http://eprints.glos.ac.uk/id/eprint/5455

Disclaimer

PLEASE SCROLL DOWN FOR TEXT.

Managing IS projects in SMEs – Tailoring the PRINCE2[TM1] methodology

Martin Wynn, Raul Brandao and Rui Shen

The history of information systems project management is littered with many well documented disasters, and even more that have not been recorded in the literature for a range of political and commercial reasons. Such failures in the public sector gave rise to the development and deployment of the PRINCE2 project management methodology, which is now used extensively in the public sector and increasingly in the private sector also. PRINCE2 is, however, a 'big beast' – a large and quite complex set of concepts, tools, processes and techniques – which can appear rather daunting when undertaking fairly small scale projects in small to medium sized enterprises (SMEs). This paper examines how two companies have adapted the PRINCE2 project management methodology to control information systems (IS) projects in organisations of circa 200 employees, on projects of about 12 months duration. The first case study (Aeroengine Bearings UK Ltd) is implementing a product life cycle management (PLM) system to control and integrate shop floor engineering and design information. In the second case study, a financial services company specialising in electronic funds collection (Allpay.net) has used PRINCE2 to project manage the implementation of a bespoke middleware product that integrates its back office systems that provide customised payment statements to individual clients. Both these business projects were undertaken via the Knowledge Transfer Partnership (KTP) scheme, which supports university academics working with industry on strategic projects.

Field of Research: project management, information systems, SMEs, knowledge transfer

1. Introduction

Brychan (1999) has underlined the importance of technology transfer networks in helping SMEs adopt new methodologies, particularly those where technology is transferred into an SME from an external source. Knowledge transfer that promotes technology diffusion is an important way of achieving increased competitiveness, particularly for SMEs (La Rovere, 1998).

It is thus not surprising that knowledge transfer between universities and SMEs is a key element of government policy to advance British industry, and

----

Martin Wynn, Reader in Business Information Systems, University of Gloucestershire Business School, the Park, Cheltenham, Gloucestershire GL50 2RH; email: mwynn@glos.ac.uk

Raul Brandao, KTP Associate at SKF Aeroengine UK, University of Gloucestershire Business School, the Park, Cheltenham Gloucestershire GL50 2RH; email: rbrandao@glos.ac.uk

Rui Shen, KTP Associate at Allpay.net, University of Gloucestershire Business School, the Park, Cheltenham Gloucestershire GL50 2RH; email: rshen@glos.ac.uk

PRINCE2® is a Trade Mark of The Office of Government Commerce

in this context, the Department of Trade and Industry (DTI) specified a range of products for supporting and promoting innovation, particularly in the field of technology development and application. (DTI, 2003). One of these products is the Knowledge Transfer Partnership (KTP), which provides direct support of circa £25 million per annum for graduates to undertake specific knowledge transfer projects in firms of all sizes, but particularly in SMEs of less than 250 staff (Wynn and Jones, 2006).

It is the deployment of this scheme to use and tailor PRINCE2 to introduce new software products in two companies that is the focus of this paper. Rai et al (1996) note that 'strategic alliances provide an effective means to improve both the economies of scale and scope offered by traditional modes of organisation', and this is evidenced in these two case studies as knowledge transfer between university and company has engendered improved project management.

2. The PRINCE2 project management methodology

PRINCE2 is a project management methodology designed for the public sector in the UK. 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 provides guidelines for Project Managers to:
- Establish terms of reference as a prerequisite to the start to a project
- Use a defined structure for delegation, authority and communication
- Divide the project into manageable stages for more accurate planning
- Ensure that resource commitment from management is part of any approval to proceed
- Provide regular but brief management reports
- Keep meetings with management to a minimum but at the vital points in the project

(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.

3. The Knowledge Transfer partnership (KTP) Scheme

The KTP scheme 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. Essentially the UK government will fund over 50% of the employment, training and support costs of an experienced graduate (called a KTP Associate) to lead these key change projects, and in addition, the government funds consultancy 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. The benefits to the company include the potential identification of new opportunities for development and growth, and the stimulus to research their outcomes. KTPs also provide dedicated additional resources to enable organisations to deliver project benefits; and they allow organisations to access new developments in specialist fields and to exploit innovative concepts and thinking in business.

Universities can derive a number of collective and individual benefits from participation in KTPs. Many of these derive from the use of KTP projects as case studies for both teaching and research. The case study method is well established as an educational technique in both higher education and continuing professional development, and some of the documented case studies coming from KTP projects can be used in both situations. For teaching-led universities, which nevertheless have a clear commitment to research-informed approaches, KTPs offer particular benefits in providing new and interesting materials for inclusion in the curriculum. KTP projects also provide opportunities for academic staff to work on live business challenges, which allow them to maintain an up to date knowledge of business thinking and methods.

4. Case Studies

4.1 SKF Aeroengine UK, Stonehouse, Gloucestershire

Background
SKF Aeroengine UK has a turnover of circa £15m and employs 210 staff in Stonehouse, Gloucestershire. It is part of the SKF group, which is considered the largest bearing manufacturer worldwide. SKF Aeroengine UK decided to make a partnership with the University of Gloucestershire to develop a KTP project with the KTP Associate working at the company for a two-year period to support the company in delivering strategic value through process change and new systems implementation.

The Project

"To plan, develop and demonstrate an integrated engineering information system to support future business competitiveness based on improved customer responsiveness" is the project mission statement, which drives the project. The implementation of a new Product Lifecycle Management (PLM) system as well as a new CAD/CAM both linked with ERP and shop floor data systems is judged the best way to support the company in delivering a big contract to its main customers.

The main software product will be NX (CAD/CAM) and Teamcenter (PLM). The Project was baptised as "Engineering Systems Integration" (ESI).

The objectives of the ESI project are to:
- Create a Business Process Map which includes contract review process, design/development, production engineering, quality planning, production planning, purchasing;
- Create a future process map based on project findings
- Implement NX (CAD/CAM) and manage the NX project pilot
- Implement the basic Teamcenter (PLM)
- Verify the need for other software packages
- Define/implement the integration of NX and Teamcenter with Coordinate Measuring Machines (CMMs) and Computer Numerical Controls (CNCs) (MAIN OBJECTIVE)
- Speed the provision of customer quotations

The use of PRINCE2

At the project outset, the project manager was trained and accredited in PRINCE2 and he decided to use some processes, components and techniques in the project. Some processes were already used due to the way KTP projects are submitted and approved by the Department of Innovation, University and Skills. The PRINCE2 tools used on this project are summarized as follows:

PRINCE2 Processes

Starting Up a Project (SU)

Usually done in all KTP projects, even before recruiting the KTP Associate, the company - in conjunction with the university - decide who will be appointed as the project executive. Therefore, after recruiting the KTP Associate who would become the project manager, SKF used the SU1 PRINCE2 sub-process (Appointing an executive and a project manager).

One of the project manager's first tasks was to appoint the project management team – the Project Board (SU3). For this task, it was not necessary to design the project management team because there were just one or two options (SU2). The development of the project brief (SU4) also was one of the project manager's first steps. Its first version detailed a project approach, which used a waterfall project lifecycle. However, the approach that looked most suitable was the spiral lifecycle, which became the agreed project approach (SU5)

Directing a Project (DP)
Two directing a project sub-processes are also normally used in all KTP projects. The submission of the project proposal by the company and the university is in effect an authorization to initiate the project (DP1). After submitting the project detail to the DIUS, Company and University wait for the project to be authorized (DP2). The Grant Offer Letter (GOL) from the DIUS can be considered as project mandate.
This particular project was divided into eight stages and each stage needs to be authorized to start and to end (DP3). When the project manager requires advice, a project board meeting is called and they give him Ad Hoc Direction (DP4). Because this project is not scheduled to complete until early 2009, the sub-process Confirming Project Closure (DP5) has not been followed but it is expected to be used in the appropriate time.

Initiating a Project (IP)
To submit a project to the DIUS, both company and university need to make an agreement on what will be the business case. At the initiation stage of this project, a plan was developed and approved by the Project Board (IP2). From time to time, project updates are given to the Project Board. With a detailed understanding of the scope, the project manager was able to refine the business case (IP3).

Manage Stages Boundaries (SB)
Unlike the project at Allpay, this project did contain a number of formal stages. The project manager prepared stage plans when at the stage start (SB1). During the stage and at its end, updates to the project plan are frequently done (SB2). At this moment, the project completed the first stage and a presentation was given containing a report of the stage end (SB5).

Controlling a Stage (CS)
During each stage, an assessment of progress was completed by the project manager and presented to the Project Board, who would assist in issue resolution as appropriate (CS2). When requested or during control meetings, the project manager reviewed the stage status reports with the Project Board (CS5).

Manage Product Delivery (MP)
Because of the nature of the project objectives, the Project Board decided not to use the Manage Product Delivery process. However, all project deliverables will be approved by them. Each stage is considered a work package and the project manager plans it accordingly.

Closing a Project (CP)
When the project closes there will probably be a task to Identify follow-up actions (CP2). It is also predicted there will be a project closure meeting to evaluate the project and its deliverables (CP3).

Planning
According to the PRINCE2 methodology, the Planning process is a support process for Starting up a Project (SU), Initiating a Project (IP) and Managing Stage Boundaries (SB) processes. Certainly some planning sub-processes were used to move forward these main processes – for example, a project plan and stage plans were developed (PL1). Each plan has a schedule (PL4), which also identifies activities and their dependencies (PL3). Estimation of time is then used

to complete the schedule (PL5). Please find below the latest version of the section "Schedule" of the project plan (Figure 1).

ID	Task Name	Start	Finish	Duration
1	Elicit process and systems/data	03/04/2007	14/12/2007	184d
2	Execute process map approvals	12/02/2008	13/06/2008	89d
3	NX4/MDE project pilot and deployment	28/01/2008	30/06/2008	111d
4	Collect process lead time for analysis	16/06/2008	16/10/2008	89d
5	Verify suitability of Teamcenter and other software packages	14/11/2007	30/03/2009	359d
6	Integration of NX4/MDE with CNCs and CMMs	01/07/2008	30/09/2008	66d
7	Speed provision of customer quotation	01/08/2008	01/01/2009	110d
8	Document future business process	03/11/2008	31/03/2009	107d

Figure 1. Project timetable for SKF ESI project

To complete the plan (PL7), one stage required a budget estimate, which was approved at Group level.

PRINCE2 Components and techniques
Only three components of the eight components have been used in the project - plans, controls and business case. Informally, a project organization was also defined. In the project plan, the Work Breakdown Structure section uses the technique Product-Based Planning to breakdown the project details.

Conclusion
Although this project did not use many of the documented templates suggested by PRINCE2, it selectively used elements of many of the eight main processes, some of the components and one technique. This highlights the options that PRINCE2 allows the user to tailor the methodology to specific project requirements.

4.2 Allpay.net, Whitestone, Herefordshire

Background
Allpay.net Ltd is a small to medium sized financial service company, specializing in electronic bill payment solutions. The leading products are swipe card payments, Internet payments, telephone payments, etc. 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 year 2007, it was listed in the Sunday Times Tech Track 100. Turnover in the last financial year was £19.9 million and current staffing is 173.

The Project
The programme between Allpay.net and University of Gloucestershire was approved and supported by the Technology Strategy Board (on behalf of the DIUS). Similar to other KTP programmes, it is to help Allpay.net Ltd to improve their competitiveness and productivity through better use of knowledge, technology and skills that reside within the University of Gloucestershire. Specifically, this project aimed to enhance the services that Allpay.net provides to its key customers, particularly the housing associations and related authorities (thus the 'Housing Middleware' project name).

A thorough feasibility study confirmed that a range of in-house legacy systems that support the Payment Information Files (PIFs) were in need of urgent replacement by a configurable, scaleable middleware product. The legacy systems transfer and manipulate data in an unwieldy way that requires much manual operation and intervention. Developing a new middleware application using up to date technology would reduce maintenance overheads and provide improved software architecture, which will help the company deliver a more robust customer service in the mid-term (Figure 2).

Middleware top level structure
Tuesday, July 01, 2008
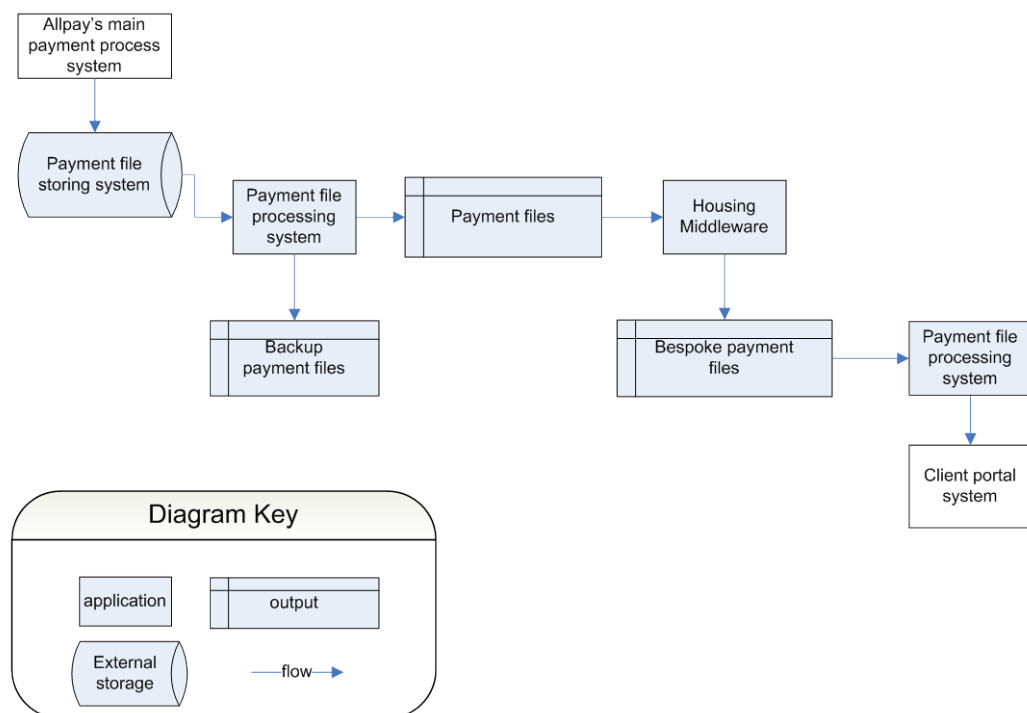
Figure2. Housing Middleware top-level structure diagram

The use of PRINCE2
The middleware project is a 14-month in-house software replacement project. The core project team consists of three staff, with the KTP Associate playing a hybrid role of project manager, business analyst and software developer. Compared to many projects conducted in the public sector, 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 of the project, the project team resolved to adapt the methodology to fit the project scope and scale. In the initial 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 Executive was established, comprising the Project Manager, the IT Director (main user), the Systems Manager (main supplier) and University supervisor. Responsibilities were agreed and clearly and formally documented. Designing and Appointing a PM Team were omitted and a project feasibility study phase was added up front, in which the Business Case for the project was reaffirmed. The Project Brief was put together, 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. Microsoft Project was selected as the main tool to plan the project (Figure 3). At this early stage, based on initial findings and known facts, the project plan was drafted. The SU stage was completed accordingly.

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 PID
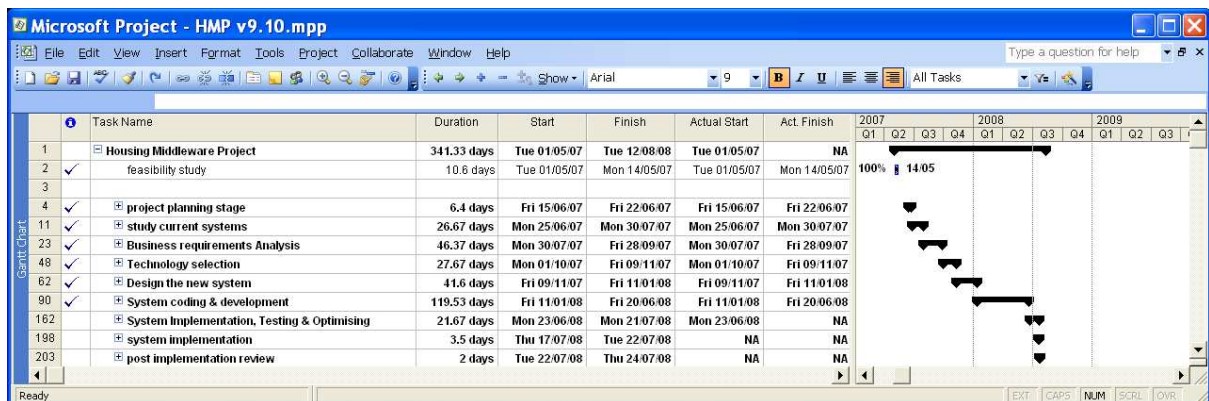
Figure3. Middleware project plan in Microsoft Project

In this stage, quality issues were discussed with all relevant parties, including the team leader of the Quality Assurance. The Quality Plan was documented and published, which defined Quality Expectations, Acceptance Criteria, Quality Responsibilities, Standard, Control and Audit Processes and Tools. The project plan was revisited, and a more detailed Project Plan was published in MS Project.

As regards the Planning Process in PRINCE2, almost all the elements were employed. Planning and re-planning was carried out throughout the project. In developing the plan, the end product was defined and analysed, activities and dependencies were identified and scheduled. The Business Case was further refined and the Risk and Issues logs were set up and used. The Planning

Process developed further as the project unfolded. 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) and Managing Stage Boundaries (SB) – i.e. at the end of one stage and start of another; and, in addition, Managing Product Delivery (MP) 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. Throughout the project, 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.

Conclusion

PRINCE2 was deployed in the middleware project at Allpay in a consistent manner from start to finish. A selected number of sub-processes, components and techniques were used, and the role of the Project Board in directing the project and electing which elements of PRINCE2 to use was critical. The end result was a project that was delivered on time and to budget, and which has delivered on its key benefit – reducing the time required for customer transaction processing by 80%.

5. Final Remarks: Checklist for PRINCE2 for small projects

Both SKF Aeroengine UK and Allpay.net illustrate 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 might be:

- **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. But do 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.**

This supports the OGC's own assertion that 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). In these guidelines for tailoring PRINCE2, the OGC stipulate a minimum set of PRINCE2 elements that aligns quite closely with the conclusions reached in this paper. The OGC 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.

The selective use of PRINCE2 elements made a significant impact on the projects discussed above. The use of these tools and concepts engendered a project discipline that kept delivery, quality, risk management and cost-benefit to the fore as the projects progressed. In both projects, probably only 25% of the PRINCE2 elements were deployed; but the fact that the other 75% were available to be used as and when needed was key. Using PRINCE2 in SMEs is like a major builder embarking on a small extension in a semi-detached property – he will only use a small percentage of the tools and resources available to him, but they are there to be called upon when required.

As regards the KTP scheme, it has consistently delivered major business benefits for companies working with local universities across the UK for over 25 years. Indeed, in recent years, the scheme has brought an average bottom-line benefit of over £200K per annum (DTI, 2006) to the companies participating in the scheme. It brings government funding to enable organisations to take advantage of the wide range of expertise available within universities, and these case studies highlight the potential of the scheme to introduce best practice as well as bottom-line benefit to participating companies. 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).

6. References

Brychan, T., 1999, "A model of diffusion of technology into SMEs", Naples Conference Proceedings, 1999 International Council for Small Business**,** accessed at www.sbaer.uca.edu/research/icsb/1999/TOC.pdf on February 14th, 2008

DTI, 2003, *DTI Innovation Report, Competing in the global economy: the innovation challenge*, December.

DTI, 2006, *Knowledge Transfer Partnerships Annual Report 2005-6,* DTI, Crown Copyright. www.DIUS.gov.uk

La Rovere, R. L., 1998, "The diffusion of information technologies and changes in the telecommunications sector: the case of the Brazilian small and medium sized enterprises" *Information Technology and People*, Vol 11, No 3, pp194-206

Office of Government Commerce (OGC), 2005, *Managing successful projects with PRINCE2*, TSO, London

Office of Government Commerce (OGC), 2006, *Tailoring PRINCE2*, TSO, London

Rai, A., Borah, S., Ramaprasad, A., 1996, "Critical success factors for strategic alliances in the information technology industry: an empirical study", *Decision Sciences*, Vol 27, No 1, pp 141-155

Sainsbury, Lord of Turville, 2007, *The Race to the Top – A review of Government's Science and Innovation policies,* HMSO, Crown Copyright, p 55.

Wynn, M and Jones, P., 2006, "Delivering Business Benefits from Knowledge Transfer Partnerships", *International Journal of Entrepreneurship and Small Business*, Vol 3, Nos 3&4

Acknowledgements

September, 2008