Comptroller and Auditor General

Special Report

Department of Education and Science

Management Information Systems in the Institute of Technology Sector

October 2007

This report was prepared on the basis of information, documentation and explanations obtained from the public bodies referred to in the report. The draft report was sent to the Department of Education and Science, An Chéim Computer Services Limited, the 13 individual Institutes of Technology, Dublin Institute of Technology and Tipperary Institute. The 13 Institutes of Technology co-ordinated their comments on the draft report through the Council of Directors of the Institutes. Where appropriate, the comments received were incorporated in the final version of the report.

Report of the Comptroller and Auditor General

Management Information Systems in the Institute of Technology Sector

I have, in accordance with the provisions of Section 9 of the Comptroller and Auditor General (Amendment) Act, 1993, carried out an examination on the implementation of management information systems in the Institutes of Technology.

I hereby submit my report on the above examination for presentation to Dáil Éireann pursuant to Section 11 of the said Act.

John Purcell
Comptroller and Auditor General

19 October 2007

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Summary of Findings

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As early as 1993, the concept of common management information systems for the institutes of technology had been proposed. The areas where common systems were suggested included student administration, financial management, personnel and payroll management, library administration and executive reporting. There was also a strong emphasis on integration of the individual systems in the initial proposal.

Some six years on, contracts were concluded with two main software suppliers. The Banner System was procured from Systems and Computer Technology Corporation (SCT) with the aim of providing an integrated solution to the needs of the institutes in the areas of student administration, financial management, personnel and executive information. The Millennium Library System was separately acquired from Innovative Interfaces Inc.

It became necessary in the course of the project to substitute alternative software for some of that initially purchased from SCT. Ultimately, the project involved a total of 59 separate implementations in the course of which the Banner Student System, Agresso Finance System, Core Human Resource and Payroll System and the Millennium Library System were installed in the institutes.

Procurement and Contracting

At the time the contract with SCT was concluded in 1998, it was known that there were gaps in the capability of the Banner Finance component of the software. However, it was considered that those difficulties could be overcome as SCT had indicated that it was developing a strategy to enter the European market in the course of which the gaps would be addressed. At that point, the benefits of integration, which the Banner software promised, were considered to more than outweigh the apparent gaps in capability.

However, by 2001, further reservations had arisen in relation to the Banner Finance System. A detailed gap analysis indicated that significant modifications would be required in order to make the software useable. It also emerged that SCT no longer had a strategic plan or sales plan for their finance system in Europe. The cost of modifying the software was estimated to be between €1.3 million and €3.8 million with at least two years being added to the timeframe for the project. Ongoing costs would also arise since most of the modifications would not be incorporated in the baseline Banner product making the future support of the system both complex and costly.

Subsequently, the suitability of the Banner Human Resource System was also called into question. As part of a comparative analysis with an alternative product, it emerged that the Banner Human Resource System only had an 18% residual fit with the institutes' requirements - after the Banner Finance System had been removed. An alternative product - Core Human Resource software was rated as having a 90% fit.

At this point, contracts had been concluded with SCT which obliged the institutes to take the deficient software. Taking account of this, new contractual arrangements were entered into. While retaining the existing contractual framework, the Agresso Finance System replaced the Banner Finance System and the Core Human Resource System was chosen to replace the Banner Human Resource System. The Core Human Resource software and Core Payroll software were subsequently implemented as an integrated package. The additional cost of acquiring replacement systems was approximately €4.2 million.

Legal advice suggested that while there were provisions in the original contract with SCT upon which the institutes could rely in litigation, it might be preferable to seek a commercially satisfactory solution

without the necessity for proceedings – particularly, since an ongoing commercial relationship with SCT was necessary on account of other system modules and litigation would have been costly, disruptive and involve considerable delay.

As an offset against the additional cost, potential credits of €1.39 million were negotiated with SCT in respect of the Banner Finance and Human Resource components which would reduce the net additional cost for the two substitute products, if and when those credits are fully realised to around €2.8 million. It has been calculated that approximately 86% of the credits negotiated have been realised to date.

Governance and Management

Initially, the project was led by a Project Steering Group chaired by the Director of Tallaght Institute of Technology and comprising representatives of the Department of Education and Science (the Department), Dublin Institute of Technology (DIT) and a number of other institutes. In 2000, the Project Steering Group was replaced by a Consortium Board representing all of the institutes and the Department with an independent chairperson.

The project suffered in the initial years from inadequate project planning, resourcing difficulties, a lack of full commitment and weak governance and management structures. A risk review carried out by KPMG in February 2001 had noted significant weaknesses with regard to planning and governance. The draft report recommended that the project should be re-assessed, restructured, re-scoped and re-planned. Weaknesses were addressed through the adoption of a revised plan in mid-2001, the use of consultants and contractors and an evolution in appropriate governance and management structures starting with the appointment of an independent chairperson to the Consortium Board in May 2000.

Project Outturn

The total cost incurred in implementing the systems was approximately €58.42 million. Costs were incurred both at a central level through the central services unit established to manage the project and at a local level by each of the institutes. Total project expenditure exceeded budget by approximately €5.7 million.

The target completion date set for the revised project in 2002 was December 2004. This target was achieved with the exception of two implementations which were completed in 2005.

Future Challenges

Challenges still exist particularly in the areas of integration/interfacing, reporting, modularisation and semesterisation, web-enabled and self-service facilities and in aligning staffing structures with the new technology. This was borne out in a survey which assessed the extent of user satisfaction with the implemented systems.

To cater for the further development and ongoing implementation and support of the systems, a limited company, An Chéim Computer Services Limited, (An Chéim) has been established as a subsidiary of DIT. Its Board of Directors is made up of representatives of the institutes, DIT and the Department.

A key challenge for An Chéim will be to ensure that the necessary procedures and expertise are in place to underpin the ongoing support and development of the systems. This includes engaging with institutes in relation to their needs, providing leadership and support in the realisation of system benefits - particularly in the area of reporting, maintaining tight control over the outsourced systems hosting contract and providing training for users.

Overall Conclusion

The original project planning was not commensurate with the scale of the work to be undertaken. As a result, unrealistic cost projections and timescales were formulated.

The inadequate planning in the initial years allied to deficiencies in governance and management of the project led to a delay in getting the project off the ground.

However, following mid-course adjustments including substitution of software, the development of a well thought out plan and improvements in governance structures, the project was effectively delivered.

The project has been successful in implementing a standard system covering the main administrative functions of the institute of technology sector. This was no mean achievement given the autonomous status of the institutes.

An initial focus on integration and on securing a 'best fit' solution to the priority need for a student system may have led to a sub-optimal choice in regard to the finance and human resource components.

Confronted with the difficulties which the institutes faced however, the decision to move away from the concept of integration of a family of products was a good one. It is generally agreed that the substituted products have provided the institutes with a much better fit in terms of functional requirements. At this point, all institutes, with the exception of DIT, have common software adapted to a common standard design hosted in a single centre and all updated to the latest release.

Unfortunately, by the time revised terms were concluded with SCT, much of the consideration in the original agreement had already been discharged. In addition, legal advice indicated that proceedings against the supplier for contract breaches would be problematic.

In the event, the credits of €1.39 million negotiated with SCT represented just 15% of the initial contract value despite the fact that two of the three major systems (Finance and HR) as well as a number of additional components purchased were not implemented. Since the initial agreement with SCT did not detail the cost of the individual components of the procurement, it is not possible to relate credits negotiated to the cost of individual software elements that were not provided. Because of this, the precise extent of the nugatory expenditure that occurred is difficult to determine. However, it is likely to have been considerable.

On a wider canvas, important lessons which emerge are

- the importance of promptly changing course when initially proposed solutions do not meet the needs of organisations

- the acquisition of 'best of breed' software combined with compatible interfaces, interoperability frameworks and data warehousing may often be the appropriate approach when addressing IT integration issues in major procurements.

Management Information Systems
in the Institute of Technology Sector

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1 Introduction

1.1 In 1993, a Joint Study Group comprising representatives of the institutes of technology (the institutes[1]) and the Department of Education and Science (the Department) was set up to examine the feasibility of providing the institutes with common management information systems. The project was approved by the Department of Finance in August 1996. Contracts for the supply and implementation of the components of the systems (with the exception of payroll) were entered into in December 1998 and March 1999, following a procurement round. However, in June 2002 alternative products had to be substituted for certain of the components purchased and a revised agreement was entered into with the successful tenderer.

1.2 During the period 1999 to 2005, a total of 59 system implementations took place in the institutes - installing software for the management of student administration, financial affairs, payroll, human resources and library functions.

1.3 The table overleaf outlines the course of events in the procurement and implementation of the system components.

Project Oversight

1.4 Following approval of the project from the Department of Finance, a Project Steering Group was established under the chairmanship of the Director of Tallaght Institute of Technology and included representatives of the Department, Dublin Institute of Technology (DIT) and a number of other institutes. The Project Steering Group was replaced in 2000 by a Consortium Board representing all of the institutes and the Department and with an independent chairperson. From then on, the Consortium Board had ultimate responsibility for the overall implementation of the project.

1.5 From mid-2002 a central services unit, headed by a project director, was used to manage and support the project at a central level. DIT acted as the contracting authority with third parties and was the employer for permanent and contract staff at the central services unit. Central funding of the project was channelled from the Department to DIT. Funding of local costs was also provided by the Department directly to the local institutes.

1.6 From August 2005, a limited company, An Chéim Computer Services Limited (An Chéim) established as a fully owned subsidiary of DIT, managed the further development and ongoing implementation and support of the systems. The Board of Directors of An Chéim is made up of representatives of the institutes, DIT and the Department.

Objectives and Scope of the Examination

1.7 The Department, as the funding agency, has a responsibility for ensuring that the funds provided are used to best effect. An Chéim is responsible for the central administration of the project. The institutes are responsible for optimising the value of the investment.

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1 Throughout this report institutes comprise the Institutes of Technology, Tipperary Institute and Dublin Institute of Technology. Most of the Institutes of Technology were established in the 1970s with a few added in the 1990s.

MIS Project in the Institute of Technology Sector - Chronology of Events

Year	Month	Event
1993	January	Joint Study Group established
1995	June	Information System Strategy Report produced by Pricewaterhouse Coopers
1996	August	Project approved by Department of Finance with cost estimate of €7.5 million
		Project Steering Group established
1998	December	Agreement with SCT for Banner software, implementation services and maintenance
1999	March	Agreement with Innovative Interfaces Inc. for Millennium Library System
	June	Project Charter developed
2000	February	Consortium Board established to replace Project Steering Group
	May	Independent Chairman appointed to the Consortium Board
2001	February	Risk Review completed by KPMG
	March	Project initiated to assess the suitability of the Banner Finance System
	July	First detailed project plan produced. Cost estimate €44.5 million with completion by January 2005
	September	Banner Student System goes live in first pilot site (Institute of Technology Tralee)
	September	Budget of €44 million approved by Department of Finance
	October	Approval of 15 permanent posts within the Central Services Unit for the project
2002	June	Replacement of Banner Finance System with Agresso Finance System - Agreements signed
	June	Department of Education and Science gave approval to recruit 26 contract staff including project managers and administrators, systems analysts, trainers and administrative staff.
	July	Decision to replace Banner Human Resource System with Core Human Resource System. A single implementation of the Core Payroll and Core Human Resource Systems to be carried out.
2003	February	Agreement with Core Computer Consultants Ltd for Human Resource/ Payroll System
	February	Agreement with Mentec International Ltd for implementation and support of the Agresso Finance System
2004	December	Agreement with Scientia Ltd for Timetabling System
2005	April	Agreement with Hewlett Packard for centralised hosting of systems
	August	An Chéim Computer Services Ltd established as a subsidiary of DIT
2006	January	Council of Directors report assessing the outcome of the project

1.8   The examination set out to review

■   how well the management of procurement of systems and related contracting was handled

■   how well the implementation project was effected

■   whether project objectives have been achieved and the extent of user satisfaction with the implemented systems.

1.9   The period under examination extended from 1995 to 2006.

Examination Methodology

1.10   The examination was conducted by staff of my Office with assistance provided by BrookHill Consulting Ltd. The examination involved

■   a review of files and documents provided by the central services team, the Department and some of the institutes

■   a survey of the 15 institutes in which the systems were implemented

■   interviews with the chairman of the Consortium Board, representatives of the Council of Directors[2] and the central project management

■   interviews with senior management and other staff involved with the project as well as users of the systems at a representative sample of five institutes

■   interviews with officials of the Department.

Structure of the Report

1.11   The results of the examination are set out in the three chapters that follow. Chapter 2 looks at the manner in which the procurement of the computer systems and the associated contracting was handled and the implications of the contract alterations which occurred. Chapter 3 looks at the overall outturn of the project in terms of cost and time. Chapter 4 assesses whether the objectives of the project have been achieved and the extent of user satisfaction with the implemented systems. It also identifies the issues and challenges which face the sector in ensuring the systems are used to best effect.

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2   The Council of Directors is an organisation which enables the 13 institutes of technology co-ordinate their work nationally. It does not include DIT or Tipperary Institute.

2 Managing Procurement

2.1 This chapter examines the arrangements for the procurement of systems, the associated contractual agreements and how gaps in the functionality of the purchased systems were addressed.

Project Planning

2.2 A Joint Study Group was established in January 1993, comprising representatives from the institutes and the Department, to examine the feasibility of providing a common management information system for the sector. With the assistance of the consultancy firm, PriceWaterhouse Coopers (PWC), a report was produced in June 1995, which set out the key elements of an information system strategy.

2.3 The report called for a core set of highly integrated systems and a loosely integrated set of essential support systems. An external interface to a Department database, to facilitate its ad hoc reporting requirements, was also envisaged.

Core Integrated Systems

The core set of highly integrated systems required were identified as

- **Student System** – covering the various stages in the student life cycle from application, registration, academic career including examinations and finally through graduation and careers.

- **Course Structure and Planning System** – covering such functions as defining courses and course models, associated resourcing (staff, rooms, materials etc), timetabling, examinations, performance monitoring and costing details.

- **Finance System** – which would record all financial transactions of the institute and cover general ledger, debtors, creditors, receipts and billing, budgeting and elements of cash management relevant to the institute environment.

- **Personnel System** – covering recruitment, training needs, staff development and staff utilisation.

- **Executive Information System** – which would be used to support the high level strategic reporting requirements of senior institute staff. For example, production of key performance indicators and statistics for the purposes of monitoring, control, planning and forecasting.

- **A Department database interfaced with the institute systems** – which would be used to hold and analyse data returned electronically from the institutes thereby supporting its reporting and policy roles.

2.4 It was envisaged that the loosely integrated set of essential support systems would operate in standalone mode in the short to medium term, with interfacing of data where appropriate to the financial system.

Essential Support Systems

The set of support systems required were identified as

- **Payroll System** – which would work independently of the core systems but would interface summary information to the finance system, research and consultancy system etc.

- **Research and Consultancy System** – which would hold research sponsor and project details.

- **Physical Resources System –** which would hold equipment details and allow for booking and usage monitoring, provide for planned maintenance, job registration, planning, materials and contract control.

- **Library System –** which would cover all aspects of the library function.

2.5 The long-term aim was to have a complete suite of applications which would be fully integrated on a site by site basis. This would ensure that data would only need to be entered once to be shared across all the systems and full and complete information was available for flexible reporting.

2.6 The report set out the software and technology strategy which it considered should be adopted. It recommended that the core systems should ideally be obtained from a single supplier so that they would work seamlessly together. The essential support systems could be obtained from different software suppliers but should be modified to integrate with the core systems, as appropriate.

Procurement of Systems

2.7 An EU public procurement competition for the required systems commenced in October 1997 using the systems concept developed in June 1995 as the basis for the systems specification in the tender documentation. The only significant deviation from the initial concept was the removal of the requirement for a Department database and interface to the institute systems which was to be implemented as a separate procurement contract. The systems developed at institute level, however, were required to be capable of generating the necessary returns for the Department in a format acceptable to it.

2.8 The degree of integration between the proposed systems and the ease with which the software could be integrated with software supplied by other vendors and with existing software in institutes were listed, in the request for tender document, among the selection criteria for the award of a contract.

2.9 Following an evaluation, in early 1998, of the tender proposals received, the evaluation team established to consider the tenders, recommended the purchase of Banner 2000 software from Systems and Computer Technology Corporation (SCT)[3] in the US, to satisfy the integrated core system requirements as well as providing the required functionality for the essential support systems in the areas of research and consultancy and physical resource management.

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3   In 2004, SCT were taken over by SunGard Data Systems Inc. and its name was changed to SunGard SCT (UK) Limited. The name SCT is used throughout this report.

2.10 A separate evaluation team established to examine the library system proposals recommended the procurement of the Millennium System from Innovative Interfaces Inc. Consideration of a payroll system was deferred at this time.

2.11 The decision to select SCT was heavily influenced by an assessment which took into account that

■ it was a worldwide established provider of systems to the academic world, particularly in the US

■ it could provide the level of tight integration recommended by PWC and

■ gaps in functionality would be addressed by SCT in the future.

2.12 The Project Steering Group endorsed the recommendations of the evaluation teams in mid - 1998 and following discussions a contract with SCT was signed on 21 December 1998. It was signed by the President of DIT, on behalf of itself and the institutes[4]. An agreement with Innovative Interfaces Inc. for the supply, implementation and support of the Millennium Library System was signed by DIT on behalf of all 15 institutes on 16 March 1999.

2.13 With the exception of the library and payroll requirements, the contract with SCT addressed the requirements in the tender specification together with additional components over and above those initially proposed. The majority of these additional components were to provide web-access and self-service facilities for users of the systems and these are outlined at Appendix A.

Gaps in Functionality

2.14 Subsequent to the completion of contract arrangements, serious reservations arose in relation to the capability of the Banner Finance component of the software[5]. In March 2001, arising from these reservations DIT decided to review the suitability of the Banner Finance System to meet its requirements.

2.15 An analysis of divergences in capability between the detailed functional user requirements and the SCT Finance software was carried out with consultancy assistance. The gap analysis determined that

■ 22 'very high impact' modifications were required to the Banner Finance software in order to make it useable

■ 42 'high impact' modifications were required for the system to go live as scheduled for January 2003.

2.16 In conjunction with the gap analysis, DIT visited the University of Greenwich to review its implementation of the Banner Finance System, its integration with other Banner Systems and the overall system implementation, configuration and maintenance effort involved.

2.17 Two different views were provided during the site visit. Finance personnel in the University of Greenwich expressed a very negative opinion on the system whereas Information Technology personnel defended the decision to choose SCT Banner. The report of the site visit noted that the University of Greenwich had been the only European University to implement the Banner Finance System.

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4   The institutes completed an acknowledgement form agreeing to be bound by the terms and conditions of the agreement.

5   This was further complicated by the emergence in September 2001 of the fact that the supplier's market strategy for Europe had altered.

2.18 In July 2001, DIT requested SCT to provide a formal response to each of the issues raised in the gap analysis including outline costs for modifying the software, the timescale involved and the impact of any modifications on future releases of the product.

Response of Supplier to Gaps in Functionality

2.19 In August 2001, SCT responded to the gap analysis report with a proposal that a number of the gaps could be accommodated through implementation of procedural changes or system modifications. SCT recommended that DIT use alternative solutions with regard to two significant items - Accounts Receivable and Bank Reconciliations - as there was not a good fit between DIT requirements and the Banner System.

2.20 An impact assessment was then carried out by DIT to review in particular, the proposed procedural change issues and to identify how those functional requirements could be addressed outside of the Banner System.

2.21 The impact assessment concluded that only three issues could possibly be accommodated through the implementation of procedural change. However even in these cases, the preferred option in each case was to modify the system. DIT considered that to accept the loss of system functionality on the scale suggested would be a major retrograde step since most of the issues were items which could be supported by the existing finance system in DIT.

2.22 SCT had indicated that most of the required system modifications were not in the baseline Banner product but were add-ons, specifically for the institutes and the cost would, therefore, have to be borne by the institutes. There would also be cost implications for the ongoing support and maintenance of the system.

2.23 This was contrary to the Project Steering Group's understanding at the time of the agreement with SCT that modifications to cater for the Irish taxation system would be incorporated into the baseline version of Banner as SCT were developing a strategy to enter the European market and such modifications would be included in the baseline version of Banner Finance.

Additional Cost of Proposed Solution

2.24 SCT initially estimated that the cost of modifications would be considerably in excess of $1 million with the implementation timeframe for two pilot sites extended from January 2003 to September 2003.

2.25 In discussions and correspondence with SCT, DIT insisted that the conditions on which the Department of Finance had approved the project, be adhered to. These were

▪ a go-live date of January 2003 for two pilot sites

▪ a set budget for implementation, support and modification of the finance system

▪ a reasonable match between the Banner Finance System (with certain modifications) and the requirements of the institutes.

Alteration of Supplier's Market Strategy

2.26 A further complication arose due to the fact that it became clear to the Consortium Board[6] from the ensuing discussions that SCT no longer had a strategic plan or sales plan for their finance module in Europe. The alternative routes identified were

■ the commencement of a programme of bespoke system modifications which would not necessarily be incorporated in the baseline Banner product, with the result that the product would either remain static or upgrades and support of the system would be complex and costly. In addition there would be a considerable additional cost in altering the software (approximately €1.3 million to €3.8 million) and at least two years would be added to the timeframe for the entire project implementation.

■ the subcontract of the finance system to another supplier with a view to achieving the project deadlines. This would be subject to the suitability of the alternative product being considered and the acceptability of the contractual arrangements.

2.27 SCT suggested that they would carry out a scoping exercise at a cost in excess of €100,000 over a six-week period, to identify the extent of the required modifications, timeframes and cost. The scoping exercise was not carried out as the suggested outline costs and timeframe associated with the system modifications were unacceptable to the Consortium Board.

Proposed Substitution of Component

2.28 In November 2001 SCT proposed that the Agresso Finance System should be implemented as an alternative to the Banner Finance System with implementation services being procured directly from Mentec International Limited.

2.29 In order to assess the suitability of Agresso, a gap analysis was carried out which identified four 'very high impact' and 19 'high impact' modifications. Most of the modifications required, however, in this case would be included in the baseline product and would not result in extra costs.

2.30 In addition to the gap analysis, two site visits were made, the first to the University of Central Lancashire in Manchester which had implemented the Agresso Finance and Banner Student Systems and the second was to Coillte in Castlebar who operated the Agresso Finance System. The reports of the visits were generally positive towards the Agresso System.

Legal Advice Received

2.31 The situation at the end of 2001 was that the institutes were contractually committed to purchase the Banner System although it had emerged that the finance component was no longer suitable for purpose. Legal advice was sought by the project management in relation to the options open to DIT and the institutes to resolve the difficulties which had arisen.

2.32 The legal advice indicated that there were provisions in the agreement with SCT upon which the institutes could rely in litigation. These were

■ a claim for breach of warranty under the agreement - which included a provision that the SCT responses and representation set out in the tender documentation were 'true and accurate in all material respects'. In order to pursue a case under this provision, it would be necessary to show that the shortcomings identified in the gap analysis were in relation to items which were required pursuant to the tender document and which SCT in their tender

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6   The Consortium Board had replaced the former Project Steering Group in February 2000.

response identified as functions which could be fulfilled by its products. Given the number and extent of shortcomings with the Banner Finance System, identified in the gap analysis, it was considered that a breach of warranty could be shown.

- a failure to comply with a clause in the agreement which provided that SCT would make diligent and good faith efforts to adapt to changes in the institutes' environment 'including …… conversion to the euro currency and other legislative changes'. While the tender from SCT did not specifically state that their product would comply with the requirements of the institutes, it was considered that an inference could be made that compliance with Irish statutory requirements was a stated objective and a fundamental prerequisite of accepting the SCT tender offer.

- a claim that SCT were incapable of providing modifications to the system within the timeframe required by the institutes and that this was a further breach of the agreement. There appeared to be documentation from SCT to support this.

2.33 However, the legal advisers warned that litigation would need to be pursued in the High Court and, if disputed, could take two to three years before a hearing. During that period extensive preparation and analysis of the Banner Systems would be required and there would be much reliance on the evidence of technical experts in order to prove breach and thereafter some form of accounting/economic analysis to quantify loss. Preparing for the case would be a time-consuming and costly exercise and from a commercial perspective would involve the institutes in considerable disruption and delay in implementation of alternative software, which loss would be very difficult to quantify and accordingly to recover.

2.34 In this situation, the legal advisers recommended that a commercially satisfactory solution should be sought without the necessity of proceedings, if possible - particularly since an ongoing commercial relationship with SCT was necessary on account of other system modules.

Further Gaps in Functionality

2.35 The Banner Finance component was not the only system with gaps between the desired and actual functionality. The suitability of the Banner Human Resource System began to be called into question in 2002. A comparative analysis between the Banner Human Resource System and the Core Human Resource software was completed by July 2002. The analysis showed that the Banner Human Resource System only had an 18% fit with the institutes' requirements in contrast with Core Human Resource software at 90%[7].

2.36 In October 2002, the Consortium Board ratified a proposal that

- the Core Human Resource software, which had been developed for the Irish market and which included, or would include in due course, the functionality to support all new statutory human resource obligations, would be used to provide the human resource functionality for the institutes in preference to the Banner Human Resource System, with an interface developed between the Core Human Resource System and the Banner Student System.

- the Human Resource System would be implemented with the Payroll System, rather than as a separate implementation project, because of the integrated nature of the Core System, the significant overlap between payroll and human resources, the cost savings associated with a joint implementation and the more timely implementation as a joint project.

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7   This 18% was the residual fit after the Banner Finance Module had been removed.

2.37 A further component of the Banner System did not fully meet the requirements of the institutes in the area of timetabling. The evaluation of the Banner Student System in 1998 had identified drawbacks with the timetabling component. For example, automated scheduling was not possible and the system would not check whether a lecturer was being timetabled for more than a set number of hours. Despite these drawbacks, it was initially considered that the benefits of integration with other Banner System modules outweighed the timetabling deficiencies and that the component would adequately support the timetabling process.

2.38 Ultimately, the institutes decided that the timetabling component of the Banner System would not adequately support their needs. Following a competition in August 2003 a contract was agreed with Scientia Ltd in December 2004 for the procurement and implementation of the Syllabus Plus Timetabling System for six of the institutes at a cost of €343,398 excluding VAT[8].

Revisions to Contractual Arrangements

2.39 In June 2002 an amendment to the software licence and service agreement of December 1998 was agreed following negotiations with SCT, clarification of a number of issues with Agresso, and the sizing and costing of modifications to the system to deliver the requirements. Under this agreement, the right of the institutes to use the Banner Finance software was terminated.

2.40 A release and settlement agreement was also signed in June 2002. Under this agreement, SCT

▪ proposed the Agresso Finance System with implementation by Mentec International Limited as a suitable replacement for the Banner Finance System

▪ agreed to assist the institutes in the acquisition of the Agresso Finance System.

2.41 Under a software sub-licensing agreement in June 2002 also, between Agresso, SCT and DIT, Agresso granted SCT, the right to sub-licence the Agresso Finance software to the institutes and SCT simultaneously granted the institutes the sub-licence.

2.42 The outcome of the revised arrangements was that

▪ the Agresso Finance System replaced the Banner Finance System

▪ the Core Human Resource System replaced the Banner Human Resource System.

2.43 A separate agreement was entered into with Mentec International Limited in February 2003, for the implementation and support of the Agresso Finance software[9].

Modules not implemented

2.44 In addition to the substitution of the components outlined above certain modules which formed part of the contract were not implemented[10]. These are outlined in Figure 2.1.

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8   Five institutes already had the Syllabus Plus software while the remaining four had software which they considered satisfactory for their purposes.

9   This agreement superceded and replaced a Heads of Agreement and Non Disclosure Agreement of May 2002 relating to the supply of interim services.

10   The 2001 plan did not include those modules within the original project scope.

Figure 2.1 Modules not Implemented

Module Purchased [a]	Purpose
Banner Alumni/Development System and Banner Web for Alumni	A system which holds data on graduates and donors.
Banner Web for Executives	A system which allows management to measure performance.
Banner Strategic Enrolment Management	A system which provides statistical information for the monitoring of performance in relation to retention and graduation.
Banner Web for Employees	A system which provides employees with on-line access to view or update personal information.
EDI Smart Software	A system which electronically transfers data thereby eliminating paperwork and postage.
SCT Aspire	A web enabled distance-learning product, which provides online registration, course delivery, advising and skills assessment independent of time and place.

Source: Analysis by Office of the Comptroller and Auditor General

Note:

a   In addition the agreement provided for the purchase of Gemstone Application-Specific Software to work with the SCT software.

2.45   The release and settlement agreement did not provide for credits in relation to the costs of modules which were not implemented.

Managing Procurement Cost

2.46   The bulk of the initial procurement was effected under two contracts

▪   a contract with Innovative Interfaces Inc. to acquire the Millennium Library System

▪   a contract with SCT to acquire, in particular, the Banner Student, Banner Finance and Banner Human Resource Systems[11].

2.47   The cost of the agreement entered into with Innovative Interfaces Inc. for the library system was €3.3 million excluding VAT and expenses. Figure 2.2 provides a breakdown of the main elements of the agreement.

Figure 2.2 Cost of Agreement with Innovative Interfaces Inc.

Elements of Agreement	Cost €million (excluding VAT and expenses)
Software Licence	1.8
Implementation Services	0.3
Support of software	1.2
Total	**3.3**

Source: Analysis by Office of the Comptroller and Auditor General

2.48   The total cost of the original agreement entered into with SCT was €9.3 million excluding VAT and expenses. Figure 2.3 outlines the main elements of the agreement.

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11   Other components purchased are outlined in Appendix A.

Figure 2.3 Cost of Agreement with SCT

Elements of Agreement[b]	Cost[a] €million (excluding VAT and expenses)
Software Licence	3.5
Implementation Services [c]	2.0
Maintenance and Improvements fees	3.8
Total Cost	**9.3**

Source: Analysis by Office of the Comptroller and Auditor General

Notes:

a   An average rate of exchange in 1999 ($1.06 to €1) has been used to convert the dollar priced contract. The above figures do not take account of subsequent currency fluctuations.

b   These were payable in instalments – software licence charge between 1999 and 2001, implementation services charge between 1999 and 2002 and maintenance and improvements fees between 1999 and 2005.

c   The implementation services acquired equated to an average of 2.5 full-time equivalent staff per year for four years. In the event, when this quantum of hours had been exhausted additional hours were purchased under separate agreements.

2.49   The structure of the contract payments was such that, by the date of the release and settlement agreement, the cost of the Banner software licence had been fully discharged, the committed implementation services charge had been almost fully expended and approximately half of the maintenance fees had been incurred. By June 2002, very little work had been completed on the Banner Systems. Figure 2.4 indicates the go-live dates for the various system implementations.

Figure 2.4 System Implementations

Go-Live Date	Banner Student System	Agresso Finance System	Core Payroll/ Human Resource System	Millennium Library System
	Number of Institutes			
1999				2
2000				5
2001	2			4
2002	5	1		3
2003	4	4	5	1
2004	3	9	9	
2005	1	1		
Totals	**15**	**15**	**14** [a]	**15**

Source: Analysis by Office of the Comptroller and Auditor General

Note:

a   Dublin Institute of Technology implemented the Core Payroll System in 1996 and the Core Human Resource System in 2006.

Additional Cost of Substitute Products

2.50   Despite the substitution of products in 2002, the SCT contract remained intact. While credits totalling €1.39 million were negotiated with SCT in respect of the Banner Finance and Human Resource products, the Agresso Finance System cost a further €3.7 million while the Core Human Resource System cost an additional €474,000. The gross cost of the substituted products was approximately €4.2 million.

2.51 The net additional cost therefore, of the two substitute products, if and when those credits are fully realised, will be in the order of €2.8 million as detailed in Figure 2.5. My examination identified credits equivalent to 86% of those negotiated that had been realised to date. Some of these were applied to separate DIT projects.

Figure 2.5 Net Additional Cost of Substitute Finance and Human Resource Products [a]

	Licence Fee	Implementation	Support	Total
	€	€	€	€
Cost of Alternative Systems				
– Agresso Finance System [b]	999,950	2,027,488	645,270 [c]	3,672,708
– Core Human Resource System	149,400	249,819 [d]	74,700 [c]	473,919
Total	**1,149,350**	**2,277,307**	**719,970**	**4,146,627**
Less: **Credits Negotiated with SCT** [e]	–	(144,659)	(1,244,317)	(1,388,976)
Net Cost of Substitution [f]	**1,149,350**	**2,132,648**	**(524,347)**	**2,757,651**

Source: Analysis by Office of the Comptroller and Auditor General

Notes:

a All costs are quoted exclusive of VAT.

b Licence provided by Agresso, implementation and support services provided by Mentec (with the exception of €52,988 by Agresso).

c In order to compare like with like the cost of three years maintenance charges of the substituted products has been included.

d A fixed price for implementing the Core Human Resource/Payroll System was not set out in the contract. A price ranging from €470,411 minimum to €691,540 maximum was anticipated. The actual cost would depend on the number of mandays involved. For the purpose of this table, an average of the minimum and maximum price range has been used to cost the implementation services. This has been apportioned between the Human Resource and Payroll components in the same proportion as the licence fee cost (43%:57%).

e Converted to euro at 5 June 2002 rate of exchange ($0.9371 to €1).

f Subject to the realisation of credits as set out in Appendix B.

The credits are outlined in detail in Appendix B.

2.52 Since the initial agreement with SCT did not detail the cost of the individual components of software purchased or the basis for the calculation of maintenance fees, an estimate of the cost of the unimplemented finance and human resource components could not be determined. Therefore, it is not possible to relate credits in the settlement agreement to the original cost of software elements that were not provided. There is likely to have been considerable nugatory expenditure as the credits of €1.39 million negotiated with SCT represent just 15% of the initial contract value[12].

2.53 In addition, a portion of the negotiated credits could only be realised in the event that additional hours were purchased from SCT. An amount of €144,659 depended on contracting additional hours of which approximately €50,000 has been realised through that mechanism. An Chéim has pointed out that at the time of the negotiations it had been determined that additional time would be necessary to implement the project.

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12 In the event, only one of the initially envisaged products - the Banner Student System - was installed.

2.54   Moreover, there is no evidence to indicate that the cost of the Agresso Finance System represented market value at that time. Some analysis of the market would be expected to have been carried out.

Views of An Chéim

2.55   In relation to contracts, the Board of An Chéim stated that a significant issue arose when SCT changed its strategy and decided that it would no longer support European versions of its financial system. Following vigorous negotiations by An Chéim, SCT substituted a better "best of breed" solution within the approved budget. The result is that the taxpayer now has solutions that are better than those originally envisaged in that they are more functionality rich, better supported and have widespread adoption within the wider Irish Public Sector. The alternative would have been to sue the vendor. That option ran the risk not only of incurring substantial expenditure, but also of delaying delivery of vital components of the management information system.

2.56   In addition, the Board stated that large projects will always have major challenges and changes always occur. It stated that in dealing with changing user requirements or changes in the market it is not prudent to be overly rigid. While the negotiations on the change were complex and took considerable time they were successfully handled and resulted in a positive outcome. The Board stated that the ICT market is constantly changing and gave an example whereby in 1999, there were five big suppliers of enterprise resource planning/financial systems – JD Edwards, Baan, Oracle, People Soft and SAP. Today only two of those remain – Oracle and SAP.

Conclusions

2.57   The original concept envisaged a core set of highly integrated information technology systems and a loosely integrated set of support systems together with an interface between the Department and the institutes. This emphasis on integration strongly influenced the decision to purchase the Banner Systems. However, some of the Banner modules were found not to be fit for the purpose intended without substantial modification.   There would have been serious cost repercussions in relation to upgrades of the system and its maintenance had the institutes persisted with the products to which they were contractually committed, since SCT were not prepared to include the required modifications in the 'baseline' Banner product.

> The pursuit of integration can be problematic especially with systems designed for other jurisdictions. The acquisition of 'best of breed' systems combined with appropriate interfaces, interoperability frameworks and data warehousing may be a preferable solution in modern procurements.

2.58   During a research visit to the University of Greenwich in 2001, the Finance personnel expressed a very negative opinion of the Banner Finance System whereas Information Technology personnel defended the decision to choose SCT Banner. In addition, the report of the site visit noted that the University of Greenwich had been the only European University to implement the Banner Finance System.   The fact that the Banner Student System appeared to suit the requirements of the institutes so well may have led to significant details in relation to the Banner Finance and Human Resource components being ignored during the initial product assessment.

> It is important when selecting software to ensure that adequate consideration is given to the views of all users of the system and that any differences in opinion between business and IT users is fully investigated prior to purchase. In addition, steps should be taken at the tender evaluation stage to ensure that undue weight is not given to information which supports a particular position without due regard being given to countervailing evidence.

2.59   Analysis at the implementation stage revealed that addressing gaps in functionality of the Banner Finance and Human Resource Systems would have required a large number of modifications at an additional cost of over $1 million and would also have given rise to significant delays in implementation. Legal advisers indicated that there was a case for litigation against the contractor but recommended that a commercially satisfactory solution should be sought in the circumstances. Alternative systems were acquired through a sub-contracting arrangement with the main contractor. The alternative systems had a much better match with the institutes' functional requirements.

> Getting the concept and the technical specification right prior to contract is essential where the procurement involves technology. Unless this is done, there is a risk that such systems following modification may be no better than existing technology. Purchasing a product or set of products without adequate evaluation of their fitness for purpose can, where they fail to meet the requirements, lead to legal challenges which are expensive in time and money terms and due to the technicality of the subject matter, must rely on expert witnesses.

2.60   By the time the release and settlement agreement was negotiated, most instalments under the original agreement had been paid. While not enough detail is provided in the original agreement to allow for precise calculation of the extent of nugatory expenditure incurred, credits negotiated represent just 15% of the initial contract value. In addition, the gross cost of substituted products was €4.2 million.

Where a set of components are acquired but global figures only exist as part of a contract, financial settlement becomes difficult and there is little transparency in the costs apportioned to items withdrawn or substituted. There is then a high risk that value will not be achieved for the money paid out.

3   Managing Implementation

3.1   The procurement challenges outlined in Chapter 2 inevitably led to the extension of the implementation timetable. However, there were further delays in the course of project initiation and project definition and implementation. This Chapter examines the causes of these delays and their impact on costs.

Project Delays

3.2   The Joint Study Group which assessed the feasibility of the project indicated in 1995 that the implementation of the systems could take place by the end of 1997. In July 1996, in a submission to the Department of Finance, the Department revised the target timeframe for completing the project to a period of five years from 1997 to 2001. In October 1998 following the completion of the tender evaluation process the planned implementation period was amended to the period 1999-2003.

3.3   There was slow progress in moving from the feasibility phase of the project through to the procurement of the system in December 1998. For example, a gap of 17 months spanning part of 1993 and 1994 occurred between the initiation of a procurement competition for consultants to develop a system specification and sanction for the appointment of PWC being received from the Department of Finance.

3.4   A further gap of almost two and a half years occurred between the system specification being produced in June 1995 and the issue of a tender notice for the procurement of systems in November 1997.

3.5   The first detailed project plan was completed in July 2001. In this plan, the project completion date was extended by a further 13 months to the end of January 2005. This project plan was revised in October 2002 with a projected completion date of December 2004.

3.6   By the revised target completion date of December 2004 some 96% of the planned implementation of the project had been achieved. The remaining implementations occurred in 2005 when the Agresso Finance System went live in Tallaght IT in March 2005 and the Banner Student System went live in Cork IT in September 2005.

3.7   Some 12 years elapsed between the initial consideration of new management information systems for the institutes in 1993 and the deployment of the last of the systems in 2005. The period 1993 – 1998 was mainly concerned with appraising the project and procuring the software and implementation services. The implementation process commenced in 1999 and continued through to September 2005. A total of 59 separate implementations occurred.

Project Definition and Implementation Delays

3.8   In addition to project initiation delays and the re-negotiation of the SCT contract, other factors which impacted significantly on the project timeframe following the commencement of the implementation phase were

▪   Inadequate project planning prior to July 2001.

▪   Difficulties associated with resourcing the project.

▪   A lack of commitment to the project by some of the institutes.

▪   Weak governance and management structures in the period prior to 2001.

Inadequate Project Planning

3.9   A project charter for the SCT Banner Systems was developed in June 1999. The charter documented the scope and objectives of the project, the project organisational structure, the roles and responsibilities of key players and outlined the procedures to be used in the administration of the project including issue resolution and change control procedures.

3.10   The sequence of deployment to the institutes was not stated but was to be determined on a priority basis by the Project Steering Group. There was no reference in the charter to a pilot site implementation. The charter did not contain a detailed project budget or a task plan showing how the implementation strategy proposed could be achieved in the timeframe envisaged.

3.11   In November 1999, due to the slow rate of progress on the project, DIT sought to carry out a separate implementation of the Banner Student System (not the common standard design being implemented in the other institutes). This proposal was endorsed by the Project Steering Group in December 1999 and agreed by the Council of Directors.

3.12   At the end of 2000, arising from concerns in relation to how the project was progressing, the Quality Assurance Subcommittee of the Consortium Board commissioned KPMG to carry out a risk review of the project. At that stage the pilot implementations of the Banner Student System in Tralee and Galway-Mayo Institutes of Technology were underway as well as the separate implementation in DIT. The draft report from KPMG in February 2001 recorded a number of weaknesses with the implementation, which if not addressed would pose a risk to the completion of the project.

3.13   Project planning inadequacy was a key finding in the KPMG draft report. The report noted that the project charter document, which was to be the basis of an agreement between the institutes for implementation of the systems, had not been formally approved by the Consortium Board and remained in draft format.   The absence of an agreement had serious implications for the management and implementation of a consortium-based project particularly in relation to the definition of roles and responsibilities.   In addition, changes to the project were not formally tracked using the charter.

3.14   The risk review found that appropriate project planning, monitoring and control procedures had not been implemented although the project spanned multiple geographical locations and business functions, and had significant implications for the participating institutes. Plans, which were developed by the SCT project manager, had been used more as a checklist of tasks to be performed and these had not been managed or adhered to. In addition, there was no measurement of progress or of key milestones and deadlines, no process to identify critical performance indicators, and no method in place to formally identify and measure strategic deliverables at each stage of the project.

3.15   Two sites which had critical implementation dates in 2001 had not, at the time of completion of the review in February 2001, received a project plan which was suitable for their requirements. As a result these sites were unsure of what was required at local level, what they needed to plan for, and what the key milestone dates and local resource implications were.

3.16   A generic implementation plan, which had been prepared by SCT, had not been tailored to the local project requirements and as a result was unmanageable and was not adhered to. Local project teams had also received a high-level implementation schedule from Central Project Management but the main focus of this document was on training. As a result of these deficiencies the two pilot sites attempted to draw up local plans but these proved ineffective due to the lack of information and communication from Central Project Management.

3.17 The risk review also looked at the separate implementation in DIT and found that the approach to project planning was similarly inadequate and posed a considerable risk to the completion of the project.

3.18 In relation to the library system project the risk report found that a charter had been developed but not signed off and that the project objectives and scope were high level in nature. A detailed and comprehensive project plan which was tailored for each library implementation was, however, available to the project team managers and was well developed and a useful working document for both the central and local teams.

3.19 In the light of these deficiencies the draft report recommended that the project should be re-assessed, restructured, re-scoped and re-planned by end March 2001. A detailed project plan should be prepared for 2001 covering key dates, duration of key tasks, deliverables, milestones, resource allocations and key dependencies.

3.20 While some of the recommendations had already been addressed by the time the draft report was issued a revised planning exercise was carried out between February and May 2001 under the direction of the Executive Group Subcommittee of the Consortium Board. The revised plan was completed in July 2001 and approved by the Consortium Board. This plan was used as a basis for the management of the project to completion in 2005.

3.21 The Council of Directors have pointed out that notwithstanding the risks identified, in practice, the pilot site implementations were completed by September 2001 as scheduled.

Difficulties in Resourcing the Project

3.22 A detailed study of the central staffing requirements for the project was carried out following the signing of the contract agreements with SCT and Innovative Interfaces Inc. in December 1998 and March 1999, respectively. The projected staffing requirement consisted of a total staff complement of 44 staff comprising 20 full-time staff and 24 short-term contract staff with an immediate requirement for 24 staff in order to allow configuration of the system to commence. The additional 20 staff were required by September 2000 at which time the actual deployments were expected to take place.

3.23 In November 1999, approval was requested from the Department to immediately fill 26 of the 44 positions.

3.24 In January 2000, SCT wrote to the project manager expressing its concern at the slow rate of progress on the project which was failing to meet the deadlines established in the project charter. SCT pointed out that the central services unit comprised only four full time staff and one temporary support person whereas consortiums of this size normally had a central support team of 20 to 40 staff. SCT warned that without the required technical support, the project could not succeed.

3.25 In February 2000, following a submission from the Department, the Department of Finance approved the 26 requested posts for the central services unit provided that these were met from within an overall provision of 400 additional posts which had previously been approved for the institute of technology sector generally.

3.26 A meeting of the Consortium Committee in August 2000 noted that there was a major crisis with regard to staffing of the project at all levels – functional team, administrative, project management and technical support and that emergency action needed to be taken to avert project disaster.

3.27   In October 2000, SCT, in response to a request from the Project Manager for additional temporary short-term support to ensure the two pilot sites went live as scheduled with the Student System in September 2001, again raised concerns regarding the delays in providing the funding and resourcing for the central services unit.

3.28   SCT recommended that the institutes and the Department should consider suspending the project if the issues could not be resolved by December 2000. SCT pointed out that delays and restarts were consuming extra hours from the original hours purchased under the implementation services agreement. These hours would be taken from some previously planned activities such as the implementation of the Alumni Development System.

3.29   The Department submitted a revised staffing request to the Department of Finance in November 2000 for the appointment of 20 permanent posts as a matter of urgency for the central services unit. The Department of Finance advised that all possible options should be considered by the project management before deciding on an optimal size and structure of a permanent central support unit.

3.30   The project manager noted in his report to the November 2000 meeting of the Consortium Board that the filling of such full time positions, even when completely approved would take some time – the project office was unable to fill existing vacancies through advertising the positions. The project manager proposed the outsourcing of the filling of the vacant posts until such time as the project was in a position to fill such posts on a full time basis. The meeting agreed to the contracting in of the necessary resources.

3.31   Following a competition by DIT, two project managers and three IT staff were contracted in by the end of February 2001. It was subsequently realised that this competition had breached EU thresholds and another competition was held in September 2001. Services were then procured from a number of IT consulting and recruitment companies.

3.32   The revised implementation plan of July 2001 provided for a smaller central services unit with 15 permanent staff. Approval was given by the Department of Finance to fill these posts.

3.33   In early 2002, in an attempt to reduce the cost of contractors and consultants and remain within budget, the Consortium Board sought approval from the Department for 26 three-year contract posts. Resource cost comparisons were submitted to the Department indicating that an annual saving of approximately €1.2 million, over the three years 2003-2005, could be achieved through the replacement of consultants and contractors with permanent and contract staff. In June 2002, the Department of Education and Science conveyed its approval to recruit 26 new contract staff.

3.34   However, the replacement of consultants with permanent and contract staff did not progress as quickly as planned as the salary levels on offer appear to have been set too low to attract the required staff. For example, the Consortium Board in October 2002 referred to attempts being made to recruit staff at annual salaries of approximately €38,000 when salaries of between €50,000 and €80,000 were available in the private sector.

3.35   A comparison of the approved resourcing with the actual position at October 2002 is set out in Figure 3.1. This shows a very high dependency on consultants. In this regard, the Council of Directors point out that the 26 contract posts were only approved in June 2002 and adequate time was required for the advertising of those posts, interviewing candidates, obtaining the approval of the Governing Board in DIT to the recruitment and the successful candidates working out notice requirements. In 2003 and 2004 the project managed to reduce the reliance on consultants and increased the number of permanent and contract staff. Some of the people who had been engaged through contract agencies were offered permanent or fixed-term contracts with the project.

Figure 3.1 Resourcing of the Project October 2002

	Approved	Actual
Permanent	15	8
Contract	28	2
Consultant	3	25
Seconded	2	4
SCT	3	2
Total	**51**	**41**

Source: Analysis by Office of the Comptroller and Auditor General

Commitment of Institutes

3.36   In September 1998, the Chairman of the Project Steering Group wrote to the Director of each of the institutes advising them of the proposal to procure the integrated Banner Systems. The proposal included the provision of a central services unit to manage the implementation and the tailoring and integration of the system and the coordination of support and training for all institutes.   Local support would be required in each institute and hardware and network components would be purchased at a local level.

3.37   The Chairman informed the Directors that the Project Steering Group intended to work with the Department to ensure that the appropriate level of resources would be available for each institute and for the central services unit. A statement of commitment on behalf of each institute was requested to ensure that the next steps could be undertaken without delay.

3.38   The letter included a standard form requesting each institute to endorse the recommendations of the Project Steering Group. Although all institutes subsequently endorsed the recommendations, not all were unequivocal commitments. For example, Cork Institute of Technology's commitment was subject to a satisfactory level of resources being made available centrally and locally and satisfactory organisation and division of responsibilities between the central and local teams. DIT generally supported the Steering Group's recommendation but subject to a re-affirmation of its commitment following a review of more detailed plans and systems design documentation.

3.39   In May 1995, the Department had requested the institutes not to purchase any management information systems pending the completion of the tendering process. Despite this, in order to meet their administrative needs in the interim, a number of institutes found that they had to invest in alternative or upgraded systems. A survey of the institutes indicated that up to €1.5 million had been incurred pending implementation of the centrally procured systems.

3.40   The State was contractually committed to the procurement from 1999 onwards. Despite this commitment the KPMG risk review of February 2001 noted that many institutes had been sceptical about the project and had not made serious preparations for implementing the Banner System.

3.41   At a meeting of the Consortium Board in May 2001 it was noted that there was still no clarity on the full commitment of the institutes to the project and there was a risk that the institutes would fail to follow the direction of the pilot sites in implementing the Banner System. The Chairman noted that of the fifteen institutes there were two reluctant institutes, three or four who were cautious with the rest being less so.

3.42 Minutes of Consortium Board meetings also indicate that a lack of clarity existed in some institutes up until late 2002 in relation to the funding of the routine posts of staff who took up positions on project teams. The Council of Directors indicated that this was a central factor which impacted on the timeframe of the project.

3.43 A lack of full buy-in to the project in its early stages impacted on the timeframe of the project and seriously endangered the implementation of a national system. The Council of Directors informed me that time was required to convince fifteen autonomous institutes with their diverse missions and priorities to accept the constraints of a single common standard design for all their management information. However, the commitment of the institutes appears to have consolidated following the preparation and approval in July 2001 of the detailed plan for the project which provided clarity on the scope, timeframe, estimated cost and implementation strategy to be adopted for the project. Other factors which contributed to this consolidation of commitment were the approval of staff resources in October 2001 and June 2002 and the successful implementation of the pilot student system sites.

Governance Structures

3.44 A Project Steering Group was established to oversee the project from 1996. The Group was chaired by the Director of Tallaght IT and included representatives of the Department, DIT and a number of other institutes. Meetings were held as required, sometimes on a monthly basis.

3.45 Minutes of meetings of the Project Steering Group indicated that there were a number of difficulties relating to the governance structures which were affecting the project. These included

- getting agreement and sign off on the project charter which defined what needed to be done over the course of the project[13]

- failure of institutes to engage and take ownership of the project

- difficulty in decision-making and in the approval of the newly proposed governance structures set out in a consortium framework agreement.

3.46 In January 2000, SCT also expressed concerns regarding the existing governance and management structures. The main concerns were

- that the Project Steering Group and the Executive Group did not have the full representation of the institutes or the authority and responsibility necessary to progress the project. No driving force existed to ensure the success of the project, without an Executive Board to assume overall senior management responsibility and ownership of the project.

- absence of the required technical support through the central services unit.

- absence of a central management team to provide support to the configuration teams.

3.47 SCT recommended that action should be taken immediately so that the project would stay on track. Otherwise, it recommended that the project be shut down temporarily until the required structures were in place.

3.48 The creation of a separate legal entity, with a Board of Directors comprising institute representatives and Department nominees, was considered as part of the new governance arrangements. A change in legislative authority would have been required however, in order to enable the institutes to form a company for the specific purpose of sharing services. This would have taken at least 18 months to put in place.

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13   The project charter was never formally approved.

3.49 In February 2000 the Directors of the institutes approved new decision-making structures. A Consortium Board[14], replaced the former Project Steering Group and, in May 2000, a partner in PWC was appointed as the independent chairperson of the Board. The Board comprised a total of 17 members and included the Director of the Central Services Unit. Meetings were held on a quarterly basis. A Central Management Team, Quality Assurance Subcommittee and Finance Subcommittee of the Board were also established.

3.50 In August 2000, the Consortium Board formally agreed its terms of reference, operating framework and standing orders. Under the terms of reference the Consortium Board had overall responsibility for the supervision of the project and in ensuring that the needs of the central services unit were met, enabling it to implement and support the management information systems. In particular, the Board was responsible for

- Supervising the project on matters of policy, budget, planning and development and strategy.

- Advising the institutes on the appropriate policies and strategies to be adopted in providing for the project requirements.

- Advising the institutes on the resources required to provide the facilities necessary to support the project.

3.51 A central services unit was the primary functional unit of the new structure. This was initially headed by the Central Services Project Manager up until the appointment of an experienced Project Director in June 2002. The Project Director was described in the project charter and project plan as having ultimate responsibility in supporting the project to a successful conclusion. The Director's responsibilities included

- managing, directing and supporting the project

- assisting in developing a high level project charter and project plan

- participating on the Project Steering Group/Consortium Board

- providing and managing project resources, including external resources such as staff provided by SCT

- controlling and managing the budget for the central services unit and other aspects of the project as required.

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14   Originally called Consortium Committee.

Weaknesses in Governance Structures

The draft report of the risk review carried out by KPMG in February 2001 set out a number of weaknesses with the existing governance and management structures which were considered to pose a risk to the successful completion of the project. The main issues raised were that

- The roles and responsibilities of the Consortium Board had not been clearly defined and communicated and it did not appear to have a clear decision making procedure. It tended towards collegiate decision-making, resulting in delays. Decisions taken at consortium level were not binding on the individual institutes.

- Meetings of the Consortium Board were only held quarterly, were not well attended and were not consistently attended by the same people.

- Although each institute was represented on the Consortium Board, not all institutes regarded the project as a high priority which was illustrated by the fact that a number of institutes had failed to respond in relation to a suitable implementation date for the systems.

- No formal structured line of reporting existed from the key parties involved in the project to the Consortium Board. Reports were presented on an ad-hoc basis, were too high level in nature, and did not measure progress against plan and key milestones.

- There were no procedures in place to ensure that action points from Consortium Board meetings were subsequently resolved.

- The Consortium Board did not adequately address the strategic aspects of the project - the focus of the project was on implementing the Student System in the two pilot sites with limited consideration being given to subsequent phases of the project and whether DIT (who were undertaking a separate Student System implementation) would rejoin the other institutes for the next phase of the project. Additionally, what would be involved in the next phase had not been defined.

- Although some consideration had been given to the creation of a legal entity or the creation of an executive for the Consortium and to the permanence or otherwise of a central support unit, no decision had been made.

- The Chairperson of the Consortium Board was an independent party but he did not have executive decision-making powers and his role was not defined in the Draft Project Charter. The report recommended that the Board appoint an executive chairperson with decision-making capability.

- The Central Management Team Subcommittee of the Consortium Board which was an important decision-making body within the project, did not meet on a regular basis, did not receive or issue regular or formal reports of project issues or the status of key decisions within the project.

- Decisions affecting academic processes needed to be referred to the Council of Registrars, an institute sector committee which was independent of the project. The report recommended that the feasibility of establishing a Council of Registrars Subcommittee as part of the MIS project should be investigated in order to ensure that decisions were made quickly.

- Limited work had been performed by the Quality Assurance Subcommittee and no formal meeting of the Finance Subcommittee had at that stage been convened.

Alterations to Governance and Management Structures 2001

3.52 In February 2001, an Executive Group, a subcommittee of the Consortium Board replaced the previous Central Management Team Subcommittee of the Board. It was chaired by the Consortium Board Chairperson. The Group became more closely involved with the project and had more frequent meetings.

3.53 The independent chairperson provided a more focussed and controlled approach to the delivery of the project as evidenced by the establishment of a clear project plan in 2001 against which monitoring and control of the project could take place.

3.54 From 2001 the management and roles of those involved in the project were clearer and more focussed – to implement the agreed schedule across the sector. Two key changes in governance and management structures helped ensure the completion of the implementation process. These were

- the appointment of an independent and experienced chairperson to the Consortium Board in early 2000

- the appointment of an experienced senior person to the position of Project Director in June 2002.

3.55 These appointments brought a level of expertise to the overall management of the project. The fact that the two appointed had no allegiance to any particular institute was particularly significant.

Views of An Chéim

3.56 The Board of An Chéim stated that there were challenges to be overcome in relation to governance of the project due to the multiple independent institutions involved, all of which had statutory autonomous governance roles to be taken into consideration. Those issues were identified and addressed before the major implementation phase was undertaken and further issues arising during the project were successfully managed through agreement with the institutions involved. It gave an example of the decision taken during the project to move to a centrally hosted solution on the grounds of cost effectiveness which required each institution to formally approve the revised arrangements.

3.57 It also stated that there was room for improvement and that would include holding the appropriate people accountable for the areas over which they have responsibility. For example, local institutes were responsible for local implementation teams, local budgets and benefits realisation. The Board considered that there was a strong case for centrally managing all budgets so that overall project costs could be monitored on an ongoing basis. However, full benefit realisation could only be achieved by the local institute implementing and changing processes to take advantage of the capabilities of the systems.

3.58 Steps are being taken by An Chéim to introduce a more formal benefits realisation and tracking programme.

3.59 With regard to project resourcing, the Board of An Chéim stated that all projects of this nature require external resources to deliver them. Given that the sector had not implemented such systems previously, there were critical skills that An Chéim could not have had and it relied on external implementation resources. It stated that there is always an optimal mix between full time employees and external implementation resources. An Chéim now has a core of full time employees and the organisation is currently being reviewed to determine the optimal structure and

staff levels for its new role as a support and development organisation. It stated that An Chéim had recently gone to market with a procurement for a Framework Agreement for external resources to ensure the best value can be obtained.

Project Cost Estimates

3.60   The cost of the project was initially estimated at between €4.7 million and €5.1 million in the PWC Report of June 1995. There were three subsequent revisions to this preliminary estimate as follows

- The estimated capital cost of the project was put at €7.5 million in a submission from the Department to the Department of Finance in July 1996, prior to the project going to tender. This was based on a three-year implementation period from 1997 to 1999 and covered 12 institutes[15].

- Following evaluation of the tenders the Project Manager submitted a revised cost estimate of €25.7 million to the Department in October 1998 which was based on a five-year implementation period from 1999 to the end of 2003.

- In July 2001, following the KPMG review, the estimated project cost was revised to €44.5 million, with the projected completion date extended to January 2005. Ongoing recurring costs after that date were estimated at €2.8 million per annum. The plan also estimated the cost of a time over-run on implementation at between €1.3 million and €2.5 million for each year that the implementation would be delayed.

3.61   The scope of work provided for under the revised estimate of €44.5 million was less that what had been envisaged when the estimate of €25.7 million was produced in 1998. For example, the revised plan made no reference to the roll out of the Executive Information System (Banner Strategic Enrolment Management and Banner Web for Executive Modules) or the Banner Alumni System to the institutes[16]. These components formed part of the Banner software purchased from SCT in December 1998.

3.62   A comparison of the 1998 and 2001 cost estimates is provided in Figure 3.2.

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15   Dun Laoghaire Institute of Art, Design and Technology, Tipperary Institute and Blanchardstown Institute of Technology did not exist at that time.

16   Apart from the rollout of the Alumni module in DIT.

Figure 3.2 Comparison of 1998 and 2001 Estimates of Central Costs

Category	Projection 1998	Budget 2001[a]	Increase/ (Decrease)
	€million	€million	€million
Core Systems			
Software – SCT Banner and Oracle	3.76	4.67	0.91
Implementation, Consultation and Training	2.90	8.16	5.26
Essential Support Systems			
Software – Millennium Library and Payroll	2.54	2.10	(0.44)
Implementation, Consultation and Training	1.14	0.62	(0.52)
Common Elements			
Hardware	2.37	5.10	2.73
Annual Maintenance	5.33	7.06	1.73
Staff and Contract Resources	6.63	12.62	5.99
Office Accommodation	1.08	3.45	2.37
Consultancy Fees	0	0.62	0.62
Other Project Costs	0	0.12	0.12
Total	**25.75**	**44.52**	**18.77**

Source: Analysis by Office of the Comptroller and Auditor General

Note:

a   The 2001 estimate was based on implementation of the SCT Banner Systems.

3.63   The key areas giving rise to the change in estimate were

- a greater involvement of SCT in the implementation, consulting and training as part of the project

- the engagement of contractors in the central services unit due to the difficulties in getting approval for and recruiting permanent and contract staff

- increased hardware costs

- increased provision for accommodation

- increased maintenance costs due to the extension in the implementation period

- a provision for modifications to the baseline Banner Finance System, for specifically Irish requirements e.g. VAT, Withholding Tax and the provisions of the Prompt Payment of Accounts Act

- negative effect of dollar exchange rate fluctuations

- an increase in inflation rates

- central costs estimated at €1.7 million in 1998 in respect of the salaries of staff seconded to the central functional teams had by 2001 been transferred to the institutes.

Monitoring Costs

3.64   Prior to 2001, the monitoring and control of costs consisted of a brief report at Project Steering Group meetings showing overall expenditure to date compared to the annual budget. The KPMG Risk Review in February 2001 noted the absence of a formal project budget review

process. The risk review had been unable to obtain a clear indication of the total expenditure on the project for the period 1998 to 2000. It further stated that

- It appeared that the project would incur significant cost overruns before all of the project deliverables were implemented and that, by the end of 2003, significantly less than originally scoped would be delivered at a significantly greater cost.

- Arrangements for funding the project and for making claims were unclear and inconsistent.

3.65 An analysis of expenditure prior to 2001 was not available for the purposes of this examination. The central project management have stated that while the overall funding and expenditure were accounted for and reported on, the individual components were not consistently recorded from year to year making it difficult to isolate the cost of individual elements.

3.66 Monitoring and control of expenditure significantly improved following approval of the revised plan in mid-2001 and the appointment of a budget controller in December of that year. Budget allocations were made to project leaders and regular financial reports on budgets and expenditure were submitted to the Finance Subcommittee of the Consortium Board as well as the Executive Group. Any expenditure in excess of €6,500 required the approval of two members of the Finance Subcommittee prior to payment. The procurement procedures which operated in DIT, applied to the project.

3.67 The revised estimate of €44.5 million did not include

- the cost of staff seconded from some of the institutes to the central services unit for the project, estimated in 2001 to cost approximately €4.2 million

- the cost of staff assigned to the individual institutes' own implementation teams estimated in 2001 to cost approximately €4 million.

3.68 The failure to include the cost of these resources meant that the estimated full cost of the project was never looked at in its totality. It also meant that the actual total costs being incurred were not being monitored at a central level. Project cost estimates should be clear, transparent and comprehensive.

3.69 A revised project plan prepared in October 2002 to incorporate changes arising from the release and settlement agreement with SCT noted that, other than a change to cash flow projections, no change in the overall project cost estimate of €44.5 million had arisen as a result of the project alterations. However, an analysis of this cost estimate indicates that costs of approximately €1.2 million associated with maintenance of the project hardware and software and projected to arise in 2005 were removed from the estimate, thereby understating the budget estimate by that amount. The maintenance costs for 2005 were met from a post-implementation budget received from the Department.

Departmental Funding

3.70 Overall, the Department provided a total of €47.5 million[17] to the project during the period 1995 to August 2005. This was applied as follows

- Pre-implementation expenditure of €1.2 million in the period 1995 to 1997.

- Expenditure of €42.52 million on implementation of the systems in the period 1998 to 2005.

- Central services and hosting expenditure of €3.4 million up to 31 August 2005.

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17   This does not include funding provided directly to the institutes.

The balance of €0.38 million represents excess funding provided up to the end of August 2005.

Actual Costs Reported

3.71 Excluding expenditure classified above as pre-implementation and central services and hosting expenditure up to the end of August 2005, the total cost reported by An Chéim and the institutes as having been incurred on implementation of the project scope as set out in the 2001 plan up to the end of 2005 was €58.42 million. This consisted of €42.52 million in respect of centralised costs and a further €15.9 million which had been incurred at local level by the institutes. The actual cost exceeded the budgeted expenditure by approximately €5.7 million. A comparison of the actual costs incurred with the budgeted expenditure is provided in Figure 3.3.

Figure 3.3 Comparison of Actual Costs Incurred with Budgeted Expenditure 1998 - 2005

	Budget	Actual Spend [a]	Difference
	€million	€million	€million
Centrally incurred implementation costs	44.52	42.52	2.00
Locally incurred implementation costs [b]	8.20	15.90	(7.70)
Total	**52.72**	**58.42**	**(5.70)**

Source: Analysis by Office of the Comptroller and Auditor General

Notes:

a   The above expenditure does not include costs of €1.2 million which were drawn down for expenditure on the project in the period 1995 to 1997 and €3.4 million incurred mainly on central services and hosting of the systems up to August 2005.

b   Budgeted costs were for staff seconded to the central services unit for the project and local project teams only. Other costs were incurred as outlined in Figure 3.4.

3.72 A breakdown of the principal elements of expenditure incurred at local institute level is provided at Figure 3.4. The expenditure figures were taken from a survey of the institutes.

Figure 3.4 Project Costs Incurred Locally by Institutes

Category	Budget	Actual
	€million	€million
Staff Allocated to Project Teams	4.0	9.8
Staff Seconded to Central Services Unit	4.2	1.3
Consultancy		1.6
Hardware		1.1
Software		0.5
Maintenance		0.3
Other		1.3
Total	**8.2**	**15.9**

Source: Analysis by Office of the Comptroller and Auditor General

3.73 The costs shown in Figure 3.4 suggest that significantly less staff were seconded to the project at a central level than had been planned (Estimated cost €4.2 million; Actual €1.3 million). However, the project consumed a far greater amount of local staff than had been anticipated (Estimated €4 million; Actual €9.8 million). With regard to staffing expenditure at a local level, the Council of Directors informed me that in 1999, the institutes were understaffed from an administrative and technical support perspective. The additional staff recruited during the project

went some way to meet the deficit in institute resources. An Chéim had no role in determining the composition of local implementation teams.

Ongoing Costs

3.74   Ongoing expenditure from 2005 has been budgeted at approximately €8.5 million for each of the years 2005 to 2007.

Views of An Chéim on Budgeting

3.75   In relation to budgeting for the project, the Board of An Chéim stated that the original estimates had been preliminary cost estimates only rather than an approved budget and had been developed many years before the full specification of the actual project. However, by the time of the initiation of the substantive spend on the project, the budget was professionally developed and was rigorously managed with the result that the project was successfully delivered with the central expenditure coming in under the approved project budget.

3.76   In relation to project costs at a local institute level, the Board pointed out that management of the local institute budget was not within the approved An Chéim budget nor was it monitored by An Chéim.

Conclusions

3.77 Deficiencies in project planning, monitoring and control procedures, prior to the commencement of the project and in the first two years of implementation made it difficult to measure progress against milestones and timeframes for delivery.

A project plan is essential to the proper management of a project especially in a multi-agency setting and should be put in place prior to project implementation. It should set out the objectives and scope of the project as well as the project deliverables and expected outcome, the key tasks and milestones, the estimated cost and timeframe, roles and responsibilities of staff and other key players, reporting and monitoring arrangements, project risks and mitigating actions, control and issue resolution processes as well as communication processes.

3.78 The project suffered from a failure to reach agreement on the resourcing of the project in a timely manner. Due to the need to keep the project moving more expensive resources in the form of consultants and contractors were used.

The extent of the staff resources including skilled resources required to implement and support an IT project should be identified prior to its commencement and early approval sought in order to ensure a successful implementation.

3.79 The risk review completed in early 2001 catalogued deficiencies in the governance and management of the project many of which were already being addressed by the Consortium Board. The establishment of strengthened governance structures, including in particular, the appointment of an independent and experienced chairperson and a project director ensured that the project was substantially implemented within the revised timeframe.

Before embarking on a project of this scale, it is essential that effective governance structures with clearly defined lines of authority, responsibility and accountability are put in place and appropriately experienced project managers with the necessary authority are appointed.

3.80 Prior to 2001 the monitoring and reporting of project costs was inadequate. Following completion of the risk review and implementation of a revised project plan in 2001 steps were taken to improve monitoring and control of project costs.

The total estimated costs associated with a project should be clearly identified for each of the constituent project elements, as part of the project planning process. The budget should identify both central and local costs and have clear cut-off procedures for the charging of expenditure up to the point of implementation.

3.81 Although the State was contractually committed to the procurement of systems from 1999 onwards, the commitment of the institutes to the project only fully consolidated in 2001/2002 when a detailed project plan emerged, approval was given for the recruitment of the required staff and the pilot student system sites were successfully implemented.

Clear commitment and buy-in of all relevant stakeholders evidenced in an approved project charter is of fundamental importance to the successful implementation of a multi-agency project.

4 Project Achievement

4.1   This chapter assesses the achievement of the project in terms of its business and system objectives as well as the extent of user satisfaction with the implemented systems. It also considers the issues and challenges which will need to be addressed to support the systems and to maximise the benefits.

Achievement of Objectives

4.2   Taking account of the project charter and related documents the following broad project goals were being pursued

- implementation of common standard systems across the institutes

- integration and interfacing of systems

- provision of adequate reporting functions

- supporting new ways of providing education

- supporting the business of the institutes

- the provision of web-enabled service and self-service software.

In addition, changes to the structure and nature of administrative work being carried out were expected to arise.

4.3   Overall, the implementation of the systems in each of the institutes has provided a platform for the better management and operation of the institutes. It has provided for managing and tracking of student data, support for emerging non-traditional education formats such as e-learning, enhanced services and information to students, staff and management, a library support service, and it helps manage the pay and non-pay costs of the institutes.

Common Standard Systems Across the Institutes

4.4   A number of common systems have been implemented in all 15 institutes. The common systems are the Banner Student System, the Agresso Finance System, the Core Human Resource and Payroll System and the Millennium Library System. In 14 of the institutes the systems are based on a common standard design. A separate design of the Banner Student System has been implemented in DIT.

4.5   There were advantages and disadvantages associated with implementing a common standard design in autonomous agencies. While the common standard design enables easier and more cost effective maintenance and support of the systems, changes to existing business processes are inevitably required to reflect the capabilities of the standard system. The institutes have generally managed this process well.

4.6   Looking forward, the adoption of a common standard system across the sector should enable collaboration between the institutes including facilitating joint programme development and more flexible service provision for students.

Integration and Interfacing of Systems

4.7   Systems integration was a key feature in the original decision to acquire the Banner software from SCT in 1998. However, with the decision to move from the Banner Finance and

Banner Human Resource System to the Agresso Finance System and Core Human Resource System respectively, the level of tight integration originally envisaged could not now be achieved.

4.8   Although the systems are not integrated to the extent originally envisaged it is considered that the Agresso and Core systems which were substituted for the integrated Banner components are more suited to the institute requirements than the originally planned Banner products. Because of the movement away from full integration a number of interfaces were instead developed between the systems and others are being planned for development.

4.9   One interface developed was between the Banner Student and the Millennium Library Systems. This interface extracts and transforms student data (identification, contact and academic data) from the Banner system and imports it into the library system allowing students to become authorised users of the library facilities. In addition, the development of an interface between the payroll and finance systems allows for the import of payroll data into the finance system at each payroll occurrence. Details of interfaces are provided in Appendix C.

4.10   There appears to be little integration of the Agresso Finance System with the Banner Student System and a significant amount of manual input is still required to reconcile fee income from students in the accounts receivable module of Banner with the actual payments received and recorded in Agresso. This area of integration between Banner and Agresso demands considerable focus in the future, with a view to minimising duplication of effort and improving reconciliation.

4.11   In a survey which queried the priorities for exploiting the components of the management information systems in the next three to five years, greater levels of integration/interfacing between systems was raised as a priority for 9 of the 15 institutes.

4.12   An Chéim have a specific responsibility to continue to develop the systems. While large-scale integration is not likely to be required, there are some specific areas which should be addressed to reduce duplication of work and to help ensure data accuracy. It will be important for An Chéim and the institutes to agree the interfaces/integration required for the future to ensure any further work in this area is meeting the needs of the institutes.

Reporting Functions

4.13   Under the Institutes of Technology Act, 2006, responsibility for the institute of technology sector transferred from the Department of Education and Science to the Higher Education Authority (HEA). The HEA already has responsibility for the State's seven universities and uses a funding model based on unit costing. A pilot of the proposed unit costing model for the institutes has been implemented using data from the management information systems. The task of moving to a unit cost model for the institutes should be made easier due to the existence of common systems across the sector.

4.14   The Agresso Finance System has enabled budgetary control to be distributed to budget holders throughout the institutes. The system provides budget holders with online access to their budget and expenditure data and allows for the creation and approval of purchase orders online. This enables budget holders to make decisions locally on their budget and expenditure and has led to greater budgetary control.

4.15   However, the examination found that many institutes have experienced difficulties in obtaining the required reports from the systems. Twelve institutes indicated that the Banner Student System could not be easily queried. Seven institutes had difficulty in querying the Agresso Finance System while four institutes had difficulty in querying the Core Human Resource/Payroll System and two institutes reported difficulty in querying the Millennium Library System. The

reporting functionality which is currently available appears to be quite minimal, is largely ad-hoc, and is dependent on the level of resources and expertise available locally within the institutes.

4.16 In the survey of institutes carried out for this examination twelve institutes indicated that data from all of the components of the management information systems could not be easily integrated for strategic management/reporting purposes.

4.17 The unstructured approach to reporting which has been adopted creates difficulties for the smaller institutes in particular, as they may not have the necessary technical skills available locally to exploit the systems in order to produce the required reports. Further work is required at a central level in order for useful operational, management and strategic reports to be produced. This is likely to require a further technical solution (e.g. data warehouse) in order to enable information for strategic reporting purposes to be drawn from the four separate systems.

Supporting New Ways of Providing Education

4.18 Meetings with selected institutes during the course of the examination indicated that the majority of institutes propose to move from the traditional education delivery model to a modularised and semesterised one and a number are already moving in this direction. While currently the system is configured to cater for the traditional education delivery model, it can be adapted to cater for modularisation and semesterisation.

4.19 Because of the risk of multiple versions being created, there is a need for a review at a national level in relation to the particular form of modularisation and semesterisation occurring at institute level in order to minimise system variations where possible.

Supporting the Business of the Institutes

4.20 Prior to the start of the project, the institutes lacked robust systems in that many different practices and procedures operated in the different institutes. As student and staff numbers grew[18], the systems supporting the institutes became increasingly fragile and unreliable. The Council of Directors believe that the implementation of the management information systems was the most sensible way of ensuring that the institutes' administrative capacity was fully developed to support the growth that was taking place.

4.21 The systems which have been implemented support the principal administrative functions associated with the running of a third level college – student and library administration, financial management, personnel management and payroll administration.

4.22 In particular, the Student System can carry out student tracking through maintaining a complete history of the student from the time of entry to the institute through to graduation. However, since the Alumni module of the system has not been implemented, information on graduates after they leave the institute is not maintained within the system. Overall, the system allows tracing for approximately 58,000 students and the facilities to manage the substantial pay and non-pay costs associated with 7,500 staff in the sector annually. It also provides a quality library support system for staff and students.

Web-Enabled Services and Self-Service Software

4.23 The systems implemented allow for devolved administration and web-enabled services in areas which were previously carried out centrally. However, only a limited number of these

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18 Full time students in the 13 Institutes of Technology (i.e. excluding DIT and Tipperary Institute) increased by 55% between 1995/1996 and 2005/2006. Staff numbers increased by 56%.

services are currently available. In some cases, the level of self-service or web-enabled service depends on the extent of the roll-out achieved in each institute.

4.24   Services which can be carried out online include

- entry by academic staff of student examination results from a remote computer and access to results electronically by students

- live examination board processing, permitting changes to be made as discussions take place at the examination board

- the creation and approval of purchase orders for electronic submission to suppliers and the making of payments by electronic funds transfer

- the access by budget holders to real-time budget and expenditure data

- the ability to request or renew library books, access exam papers, reading lists and journals, reserve a PC or a room in the library, carry out inter-library searches and inter-library loans, produce purchase orders for books and submit them electronically to suppliers.

4.25   While the human resource system has particular self-service features such as the facility for electronic submission and approval of leave applications and travel and subsistence claims and allows staff the ability to view their payslips online, not all these features have been implemented in all institutes.

4.26   There is scope for further reducing hard copy and manual reviews in many areas – in particular through online student registration and online payment of fees.

Changes to Administrative Structures

4.27   In November 1999, Chapman Flood Mazars produced a report on behalf of the Council of Directors on the adequacy and appropriateness of the administrative and library staffing structures to meet the current and future requirements of the institutes.

4.28   The review found that, with the introduction of the new management information systems, administrative and library staff would be working in a very different environment in the future where the use of technology could change the structure and the nature of the work they were carrying out. The report recommended that a review be undertaken at the earliest practicable stage to determine the implications of the management information systems for the work practices and procedures of staff in the administrative and library areas. The consultants indicated that, in their experience, the introduction of major systems similar to the Banner System had led to a rationalisation in work practices and they recommended that, notwithstanding the technical system developments, management should take steps to ensure that the administrative activities of each institute were carried out in the most efficient and effective manner.

4.29   All institutes report an increase in staff numbers directly associated with the maintenance/exploitation of the management information systems. For example, in DIT, two positions were created on the functional side – an Agresso Project Manager and a Human Resource Project Manager. In addition three positions were created in the Information Systems Department to support the systems. In Waterford Institute of Technology, three positions were created – an MIS Programme Manager, a technician and an administration post.   In Blanchardstown Institute of Technology, four positions were created – a Grade VII (Student System Officer), two Grade VI positions (a Student Data Officer and a Systems Librarian) and a technician.

4.30   No review has yet taken place to determine the impact of the management information systems on the work practices and procedures of staff in the administrative and library areas. With

the systems now in place for several years in many institutes, it would be worthwhile to commission a review of staffing in these areas.

Quantification of Benefits

4.31   No cost benefit analysis was carried out at the inception of the project. Neither has there been a review to attempt to quantify the financial benefits of the implementations. It is recognised that, given the start-up stage of development which institutes were going through, baseline and comparative figures would be difficult to estimate or derive. In the area of central hosting, however, there is scope for a retrospective cost benefit analysis.

4.32   During 2005 and 2006 fourteen institutes[19] transferred their systems from being locally hosted and supported to a centralised hosting environment with access by users over a wide area network. This was a key change in implementation strategy and was based upon an IBM assessment in January 2003 of the relative merits of centralised versus distributed hosting options. The IBM report estimated that cumulatively over five years, the central model recurring costs would be between €21.7 million and €25 million less than those associated with the distributed model. Towards the end of the five-year period there would be merit in reviewing the costs being experienced on the central hosting option to ensure that costs and benefits are in line with projections.

User Satisfaction

4.33   The extent of user satisfaction with the systems implemented has been assessed for the purpose of this examination using

▪   replies to a survey of the 15 institutes

▪   feedback from interviews in five selected institutes with senior management, persons directly involved with the project implementation and systems users.

4.34   Fourteen of the fifteen institutes indicated in reply to the survey that there are gaps or drawbacks with the components of the management information systems as they currently operate. In addition to the need for further interfacing and difficulties with extracting reports referred to earlier in the chapter, a number of institutes also indicated that

▪   The Banner Student System is not user friendly.

▪   Further web functionality is required.

▪   There was a failure to meet user expectations and needs in certain instances.

Banner Student System

4.35   An analysis of user satisfaction with each of the systems implemented indicates a relatively high level of satisfaction with the Library, Human Resource/Payroll and Finance Systems. However, almost half of the institutes rated the Banner Student System as average, or poor in meeting the needs of the institutes.

4.36   Twelve of the institutes did not consider the Banner Student System to be a user friendly system. Some of the comments made were that

▪   it is complex

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19   DIT is not part of the arrangement.

- it is cumbersome and not at all intuitive

- it does not have a 'Windows' feel

- it requires going through a lot of forms in order to look up / query student information

- it requires a huge level of training and re-training

- it has a poor front-end/interface with the user (this was being redesigned for a new release)

- it is not a modern system

- regular users are more satisfied with the system than infrequent users.

Web Functionality

4.37   More than half of the institutes were not satisfied with the level of web services currently available to their customers.   In particular, student application, registration and fee payment processes were identified as areas where web functionality would be desirable.   Other areas identified for development were

- employee self-service and student self-administration

- integration with Web CT (online learning system)

- access to records/transcripts by third parties

- migration to modular use of the Banner System

- an upgrade of the Agresso System to the web enabled version

- single sign-on technology for all online applications.

User Expectations and Needs

4.38   When asked in the survey as to whether, overall, the systems had met the expectations of users, only three institutes gave a positive response. The remaining 12 institutes considered that the expectations of users were only partially met by the systems.

4.39   Thirteen institutes indicated that it had been necessary to procure additional software or add-on features to work alongside the components of the management information systems in order to fully meet the needs of users.

4.40   Ten of those institutes were using separate reporting software[20] in order to generate required reports.

4.41   Additional development work or the use of spreadsheets or databases for specific purposes had also been necessary in a number of institutes.   For example, in Waterford Institute of Technology (WIT) sub-systems were developed locally to handle examination timetabling, examination appeals and the loading of bank transactions into the Banner Student System.   In addition, due to problems with the accounts receivable module of the Banner Student System, WIT implemented its own process for handling the invoicing of students. Development work in WIT was carried out without interfering with the common standard design. A number of other institutes noted the need for additional development work to generate Bank Giro and Registration forms.

4.42   The areas of timetabling and fixed asset tracking were also identified by institutes as areas where additional software was needed to meet the needs of users.

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20   Those included Discoverer, Crystal Reports, Toad and Microsoft Access.

4.43   No standard system is likely to cater for every specific user need. Consequently, local add-ons in the form of spreadsheets may need to be used for data analysis and management. An Chéim should ensure that central solutions are developed where a sectoral need for specific functionality has been identified.

Other Issues

4.44   Other issues which arose concerned

■   the loss of independence/autonomy at institute level consequent on the introduction of central hosting

■   system performance issues and the increased amount of downtime

■   the responsiveness of support personnel to issues raised by institutes

■   the loss of expertise within the central services unit and a less than adequate transfer of expertise to the service provider

■   a lack of staff resources for ongoing development and support of the systems as well as difficulties associated with administrative staff movements.

Issues and Challenges for the Sector

4.45   Now that the systems have been implemented there needs to be a focus on the provision of strategic management information within the institutes and, in order to leverage such reporting most effectively, to develop a strategic management capability across the sector.

4.46   The Council of Directors reviewed the implementation of the systems in a report produced in January 2006. The report identified a number of challenges which needed to be addressed if the full benefits are to be achieved from the implemented systems. A number of the issues relate to the new role of An Chéim which was transforming from being a project implementation group to a customer service organisation with a distinctly different mission. In addition, the institutes were moving from project implementation to ongoing operations and utilisation of the systems.

4.47   The report stated that the primary challenge related to the scale and complexity of the systems, particularly the Banner Student System. This would necessitate a significant level of expertise and knowledge to continuously operate the systems to maximise their benefits. While that level of knowledge and expertise was considered to be available through the central support organisation, a degree of dedicated expertise and support would also be required at local level.

4.48   The complexity of the systems indicated an on-going requirement for staff training and an increase in the time required for staff to adapt to new functional areas and become proficient at operational level.

> *Challenges Noted by the Council of Directors - 2006*
>
> *Ownership*
>
> The institutes needed to accept ownership of the on-going development and implementation of the systems and of An Chéim as the support organisation which was now a company with its own Board of Directors representing the institutes and the Department.
>
> *Local Expertise and Support*
>
> While a central support unit to manage the system development, software upgrades and integration had been agreed and was being implemented, local expertise and support would also be required so that the institutes could exploit the available resources to maximum effect. The report noted that in the absence of such support, institutes would not be in a position to take advantage of the full capabilities of the systems or to ensure the integrity of the databases over time.
>
> *Customer Service and Communications*
>
> The report acknowledged that difficulties had been experienced by institutes during the implementation phase regarding the manner of operation of An Chéim. It stated that there was a need for An Chéim to develop a strong customer relations focus in managing and delivering its services to the institutes in the future. Equally, institutes needed to recognise that An Chéim was a partner in the process and work with them to ensure a mutually beneficial service was obtained.
>
> *Further Development and Stability*
>
> An appropriate balance was required between the need for further development of the systems and the need for stability in existing functionality. The report recognised an inherent conflict in this area since the institutes were simultaneously demanding an enhanced set of reports and that deficiencies in the existing applications be rectified, while also requiring enhancements in functionality (e.g. web functionality, online payments, modularisation) and other applications (e.g. document handling). The institutes needed to take ownership of this process in consultation with An Chéim, in order to provide informed guidance to An Chéim and to understand the issues involved in the decision process.

Future Role of An Chéim

4.49   In July 2004, a high level budget was produced for An Chéim to enable it to fulfil its role in supporting the institutes in the maintenance and development of the information systems. The budgeted expenditure for each of the three years 2005 to 2007 was €8.6 million, €8.5 million and €8.7 million, respectively.

4.50   The manner in which the systems would evolve over these years was set out in a document entitled 'Application Roadmap 2005-2007'. The document detailed the enhancements that were then planned for delivery, in the areas of upgrades and additional functionality. It also set out areas of new functionality which would complement the existing systems to enable them to reflect the changing requirements in the higher education sector and those of an increasingly technologically literate market. These included areas such as, the roll out of employee self-service capability from the Core Human Resource/Payroll and the development of an interface between the Core Human Resource System and the Millennium Library System. The document also dealt with longer-term options for development such as workflow, imaging and document management, reporting and Alumni.

4.51   This document did not set out targets for what could be achieved in each year. Nor did it link its planned activities with cost estimates. Each of the activities within the roadmap could be classified as mini-projects in their own right which will require proper planning and appraisal.

Unless proper structures are established and the confidence of the institutes attained, difficulties could be experienced in the ongoing development of the implemented systems.

4.52   It appears that much of the technical expertise that has been built up during the implementation period is being dissipated at local level and within An Chéim. In order to ensure that the necessary skill levels are maintained arrangements should be put in place with the firm contracted to provide the hosting of the systems to build and maintain the necessary levels of expertise in the various systems.

4.53   The change to implementation of separate systems means that interoperability of systems will become a key strategy for the future development of the systems. A strategy should be developed by An Chéim to ensure that the systems which have been implemented and others, which will be implemented in the future, can interoperate with each other. In addition, it is important that the concept and reality of a common standard system is maintained in the future. Without the strict enforcement of such a strategy, the support and maintenance of the systems across the separate institutes could become logistically and technically very difficult and costly. The challenge for An Chéim will be to maintain the discipline of the standard system while at the same time being responsive to the business needs of each institute.

4.54   An Chéim will also need to develop a strategy to deal with major upgrades of the system. For example, a significant product upgrade having an impact on user interface, process or integration with other systems, may require the establishment of mini-project teams in all institutes. It cannot be presumed that the level of implementation capability that existed locally during the lifetime of the project will exist in the future. Most local project teams have been disbanded, with a resultant significant loss of expertise and experience. The further development of the systems will however, place very significant demands on the local institutes.

4.55   The significant investment made to date is likely to be undermined if ongoing development of the systems is not properly and professionally supported. This must include a recognition that not all of the institutes have the same levels of expertise and resources to continue to develop the systems.

4.56   Each institute needs to take meaningful ownership of the systems, particularly the Banner Student System, in its own institute. This entails ensuring that the development of the business of the institute is closely aligned with the development of the management information systems. It also demands that each institute play a proactive role with other institutes and An Chéim in the co-ordination of future development work, that internal policies and procedures are streamlined in line with opportunities provided by the systems, that robust training systems are provided and that the management information systems are regarded as crucial elements of the management of the institute, providing data and functionality crucial to the development of the business.

Views of An Chéim

4.57   In assessing the success of the project, the Board of An Chéim stated that the project as scoped was delivered on time and within the agreed budget and that it was a success in that the systems are operational. A key aspect of the project which it considered needed to be stressed was that the project successfully implemented a number of key applications in fifteen autonomous institutes, overcoming the difficulties which such autonomy inherently brings. It stated that the key stakeholders were broadly happy with the progress and the success achieved to date. The centrally managed budget of €45 million had been adhered to and that element of the project had actually come in under budget.

4.58 In addition the Board stated that the systems implemented assisted in the management of core aspects of each institutions' business on a round the clock basis including

■ Registering learners on approved programmes and modules, tracking their academic progress to graduation, processing all examination records and maintaining a database of learner data to support lifelong learning records.

■ Managing an extensive library stock and access to online resources in each institute and supporting the sharing of such resources between institutes.

■ Managing the recruitment of staff and administering the payroll for all academic, administrative and support staff in the sector.

■ Processing the procurement of all supplies and payment of suppliers in the fifteen institutes.

■ Implementing a timetabling system that can interface with payroll and human resource systems to facilitate the production of management reports.

Conclusions

4.59   The project has successfully implemented systems which provide a platform for the better management and operation of the institutes. At this point all institutes, with the exception of DIT, have common software adapted to a common standard design hosted in a single centre and all upgraded to the latest release.   However, challenges still exist in the areas of integration/interfacing, reporting, modularisation and semesterisation, web-enabled and self-service facilities and in aligning staffing structures with the new technology. This was borne out in user satisfaction surveys.

> In order to move smoothly into the post-development stage there needs to be a shared view of how the benefits can be exploited and the relative priority of future development work.

4.60   No cost benefit analysis was carried out to assess the potential financial benefits of the implementations. It is recognised that, given the start-up stage of development which institutes were going through, baseline and comparative figures would be difficult to estimate or derive. A review of the merits of having the systems centrally hosted was however, carried out in 2003 with marginal costs over a five-year period projected to be between €21.7 million and €25 million less than those associated with the distributed model.

> Towards the end of the five-year period, there would be merit in reviewing the costs being experienced on the central hosting option to ensure that costs and benefits are in line with projections.

4.61   No review has yet taken place to determine the implications of the management information systems on the work practices and procedures of staff in the institutes.

> A business process review should now take place across the sector to ensure that work practices are effectively aligned with system requirements and vice versa and to examine opportunities for reducing administrative costs.

4.62   Responsibility for future co-ordination has been given to An Chéim which has been transformed from a project steering and management group into a permanent structure supporting the shared system on behalf of the institutes. While it is appreciated that the transition from project development to operations is often a period of difficulty, it is essential that An Chéim acts quickly and decisively to reposition itself appropriately.

As part of this repositioning, it is recommended that

- A review of the governance and management arrangements should be undertaken to ensure that the required level of senior expertise is in place within An Chéim.

- Arrangements for engaging with the institutes in the post-implementation period should be established to ensure that the needs of users are addressed in a timely manner while at the same time maintaining the standard design.

- Measures should be taken to support those institutes that do not have the capacity, resources or awareness to effectively realise the potential of the management information systems.

- Tight control should be maintained by An Chéim over the outsourced systems hosting contract which can only be assessed as a sound strategic decision if service levels are acceptable.

- Training should be implemented at a central level and An Chéim appears to be the appropriate means through which this can be done effectively under existing arrangements.

- A more dynamic approach to reporting and use of data from the systems should be taken. An Chéim needs to provide leadership in this regard, as some institutes have minimal capacity to develop reports. The use of effective reporting will be a key factor in deriving business benefits from investment in the systems.

4.63 An Chéim has assured me that it is conducting an analysis of utilisation of the systems currently in use in order to conclude on the extent of their exploitation by the institutes and that key future work will include

- providing users with an alternative service delivery channel via the web in the areas of applications, admissions, registration and payments

- supporting the roll out of modularisation in the institutes

- enhancing reporting.

Appendices

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Appendix A   Banner Software and Additional Components Purchased

Figure A.1 Banner Software Purchased (to satisfy conceptual scope)

Requirement	Proposed Software
Student System	Banner 2000 Student System
Course Structure and Planning System	Banner 2000 Student System and Banner 2000 Alumni/Development System
Finance System	Banner 2000 Finance System
Personnel System	Banner 2000 Human Resource System
Executive Information System	Banner 2000 Web for Executives and Banner 2000 Ad Hoc Reporting capability
Research and Consultancy	Module of Banner 2000 Finance
Physical Resources Management	Modules of Banner 2000 Student, Finance, and Banner 2000 General.

The additional components purchased as part of the package are set out in Figure A.2.

Figure A.2 Additional Components Purchased (beyond conceptual scope)

Software
Banner 2000 Web for Students
Banner 2000 Web for Faculty and Advisors
Banner 2000 Web for Alumni
Banner 2000 Web for Employees
Banner 2000 Strategic Enrolment Management
GemStone Application-Specific Software
EDI Smart Software
SCT Aspire

Appendix B   Credits Negotiated with SCT in respect of the substitution of the Banner Finance and Human Resource Components

The combined credits negotiated with SCT under a release and settlement agreement[21] in June 2002 and subsequently, in exchange for the release of the Banner Finance and Human Resource components from the original contract amounted to €1.39 million[22].

The credits fell into two main categories

(a)   amounts which would reduce contracted liabilities to SCT including liabilities falling due on a prospective basis totalling €1,175,536

(b)   further potential credits of €213,440 which were related to future work by SCT not provided for in the existing contract.

The credits towards contract liability reduction consisted of

▪   A credit in respect of maintenance and improvements fees on the Banner Finance System under the Master Technical Currency Agreement on a prospective basis amounting to €115,249, €119,518 and €123,786 for calendar years 2003, 2004 and 2005 respectively.

▪   A credit in respect of maintenance and improvements fees on the Banner Human Resource System amounting to €94,830, €90,561 and €86,293 for calendar years 2003, 2004 and 2005 respectively.

▪   A further credit in respect of maintenance and improvements fees of €106,712 pursuant to the Master Technical Currency Agreement to be used evenly over the four years 2002 – 2005 (i.e. €26,678 per annum) against maintenance and improvements fees otherwise due in each of those years.

▪   An additional 'Limited Restrictions Credit' of €438,587 to be used in respect of obligations arising after the date of the agreement with not more than 20% to be used in 2002 and no more than 33.3% in any one calendar year after that up until the end of December 2005.

The future work credits related to

▪   An ability to buy services from SCT at €26.68 below the prevailing hourly rate of €170 up to a maximum of 4000 hours and up to June 2003. The maximum potential credit available was €106,720.

▪   An ability to buy services between July 2003 and June 2005 at €26.68 below the relevant hourly rate of €187 up to a maximum of 4000 hours. The maximum potential credit available was €106,720.

Since no final decision, on whether or not to implement the contracted Banner Human Resource System, had been made at the date of the release and settlement agreement, the agreement

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21   The original agreement comprised three elements – A Master Software Licence Agreement, A Master Software Services Agreement and a Master Technical Currency Agreement.

22   All amounts converted to Euro at 5 June 2002 exchange rate ($0.9371 to €1).

contained a provision allowing for the conversion of a maximum of 2,666 hours[23] at €26.68 from a future works credit to a 'Limited Rights Improvement Fee Credit' (LRIFC), if the institutes subsequently decided not to implement the Banner Human Resource System. The conversion did not effect the total value of the negotiated credits - only the manner of utilisation altered.

In order to avail of the LRIFC, the institutes were required to commit to a four-year extension of the Master Technical Currency Agreement for the Banner Student System, beyond its initial expiry period of 31 December 2005. The LRIFC was to be applied over the four-year extension with one-quarter being applied against maintenance and improvements fees otherwise due in each of the years 2006 to 2009 inclusive.

The amount subsequently converted to a LRIFC was €68,781[24].

Figure B.1 provides a summary of the elements of the settlement negotiated with SCT.

Figure B.1 Elements of the Settlement Negotiated with SCT [a]

Credit	Implementation €	Support €	Total €
Maintenance and Improvements Fee Obligations on Banner Finance System		358,553	358,553
Maintenance and Improvements Fee Obligations on Banner Human Resource System		271,684	271,684
Further Maintenance and Improvements Fee Credit		106,712	106,712
Limited Restrictions Credit		438,587	438,587
Ability to buy implementation services at reduced rates	213,440		
Less: Amount converted to Limited Rights Improvements Fee Credit	(68,781)	144,659	144,659
Limited Rights Improvements Fee Credit		68,781[b]	68,781
Total Credits Negotiated	**144,659**	**1,244,317**	**1,388,976**

Source: Analysis by Office of the Comptroller and Auditor General

Notes:

a   Converted to euro at 5 June 2002 rate of exchange ($0.9371 to €1)

b   The realisation of this amount is contingent upon the renewal of the Master Technical Currency Agreement covering the period 2006 to 2009. This has not yet been renewed.

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23   2666 hours less any hours utilised towards implementation or in carrying out an assessment of the Banner Human Resource System.

24   2666 hours less 88 hours used in carrying out an assessment of the Banner Human Resource product, at a rate of €26.68 per hour.

Appendix C Existing System Interfaces

Title	Description
Central Applications Office (CAO) - Student	The CAO Interface provides the facility to load data files provided by the CAO into the SCT Banner Student Application.
Student – Finance (Finance Journal)	Produces a Finance Journal and supporting analysis reports that enable Institutes to record Banner Accounts Receivable data in their Finance Systems.
Student – Finance (Electronic Interface)	Automation of Finance Journal so as it can be electronically loaded into the Agresso System.
Student – ID Card Systems	Records data related to a student in a format that is accessible by both Banner and external ID card systems. This data can be used to provide the relevant details for display on a student's ID Card.
Student – Library	This interface extracts and transforms student data (identification, contact and academic data) from the Student System for import into the Library System whereupon the students are set-up as library patrons, thus allowing them to make use of the library facilities.
HR Payroll – Finance	This interface extracts payroll information and imports the data into the Finance System at a nominal account level.
HR Payroll Expense – Finance	This interface transfers expenses processed in the Human Resource System to the Finance System.
Library – Finance	To import approved invoices from the library system to the Finance System for subsequent payment. This interface has been developed by DIT and is in operation in DIT.
Student – HEA Student Record System	This interface was developed to meet a new requirement for the Institutes of Technology to provide student, graduate and programme data to the Higher Education Authority (HEA) on an annual basis, to the HEA's published specifications. The output from the process is uploaded directly into the HEA Student Record System via its website.
Student– HETAC Student Record System	This interface compiles the results of the Institutes' examination sessions for submission to HETAC.