Making the Business Case for IT Investments
Through Facts, Faith, and Fear

Abstract

Business cases are an essential document for organizational investments in information technologies (IT). Yet, many organizations lack formal methods for writing, understanding, and acting on business cases. Similarly, IS courses have often struggled to adequately teach what students how to write business cases. The following are two actual business cases that were drawn from work with a real company. They are unaltered in any way except for disguising the name of the company. The use of two cases allows students to learn by contrasting the merits of grounding IT investments in arguments of *fact*, *faith*, or *fear*. A detailed teaching note is also provided. The cases have been used effectively with multiple MBA and Executive Education audiences.

Making the Business Case for IT Investments
Through Facts, Faith, and Fear

Teaching Note[1]

Purpose

Business cases are an essential document for organizational investments in information technologies (IT). Yet, teaching business students how to write, interpret, and analyze business cases has often been a challenging part of Information Systems courses. This teaching note provides instructions for using two, starkly different real-world business cases as a learning exercise. The use of two cases allows students to learn by contrasting the merits of grounding IT investments in arguments of fact, faith, or fear. The cases have been used effectively with multiple MBA and Executive Education audiences.

Synopsis of the Cases

The cases are actual business cases that were put forth for capital funding in two different multi-national companies. They are unaltered in any way with the exception of disguising the name of the company and its industry. They differ in terms of their potential strategic benefit to the company, cost, necessity, quality of writing, depth of analysis, and support of the analyses presented. An abstract for each case follows, and they are listed in the recommended reading sequence.

Consumer Products International (CPI) HR Intranet & Virtual University

CPI's Human Resources (HR) systems are in disarray. Christopher Martin and James Cameron, the project's sponsors, describe the problem as a lack of integration among disparate HR systems that leads to extensive duplication and waste of effort. They propose an HR Intranet for $350,000 to "speed up the process of skill absorption" and to create "one-stop shopping for all HR systems and executive tools." Their business case is largely grounded in arguments of faith regarding the organizational impact of the new system. Their analysis reports on both quantifiable and non-quantifiable benefits, includes a risk analysis, two alternatives, and an action plan. They calculate a net present value for the five years of the project at $1,601.

Biogenetica's San Jose ITSA Replacement Project

Biogenetica has an eight-year old aging system that is no longer supported by its supplier, is experiencing breakdowns, and is not Millennium (Year 2000) compliant. Brian Smith, the project's sponsor, proposes a complete replacement of the system with the aim of replicating the existing functionality. He invokes some arguments of fact, some of faith, and some of fear in his business case. The project is proposed to cost $600,000 with a payback period of 3.5 years and an internal rate of return of 23%. The case contains a project scope and timeline, listing of tangible and intangible benefits, risk and sensitivity analyses, and an executive summary.

Teaching Design

The striking differences between the two cases are the key to their effectiveness as a learning exercise. Some of those issues on which they differ are highlighted in Table 1. A facilitated class discussion can

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[1] This Teaching Note and the accompanying business cases (Consumer Products International and Biogenetica) were prepared Professors Bradley C. Wheeler and George M. Marakas of Indiana University (1999) ©.

help students to surface most of these on their own. It is easy for the "by the numbers" students to completely ignore the strategic or possible organizational benefits of the two proposals. The two cases also provide ample fodder for the challenges of expressing intangible benefits.

Issue:	Consumer Products International	Biogenetica
Primary basis of argument	Faith	Facts, (some) Fear
Potential strategic impact on the organization	If implemented along with major organizational changes, a cultural shift to a learning organization with greater reliance on personal development *could possibly* have a significant effect on the company	Low as the ITSA is an essential, but nonstrategic, system investment
Necessity of action	Optional	Absolutely essential for Millennium compliance
Quality of writing and presentation	Generally weak and poorly organized	Generally very good. Clear writing, good organization, and executive summary,
Quality of analysis	Subject to serious questioning of assumptions and methods used for calculating NPV	Generally good with a sensitivity analysis

Table I Contrasting Issues in the Two Cases

Teaching Plan for 75 Minute Class

- Pre-class role play with feedback memo

- (15 Minutes) Opening question and discussion of CPI

- (10 Minutes) Mini-lecture on the use of *facts, faith,* or *fear* (3 F's) as the basis of arguing for IT investments

- (20 Minutes) Collaborative Learning Exercise (CLE)

- (10 Minutes) Analysis of ALE insights

- (10 Minutes) Question and discussion of Biogenetica

- (10 Minutes) Contrast and closing

The business case exercise works best with a pre-class, role-play assignment where students are asked to assume the role of a senior manager who has received the business case and must give feedback to its sponsors. The students are charged with writing a brief feedback memorandum discussing the business cases' suitability for submission to the capital budgeting committee. This pre-class exercise is

especially valuable if the professor can receive and review them via prior to class. Electronic submission via email or a web-based forum is ideal (as long as access to view other students' work can be restricted until after the due date). Appendix A provides an example of a well-written response and may be useful as a handout. We have given the following specific instructions to students for writing this pre-class memo:

> *Your pre-class assignment is to read the Consumer Products International HR-Intranet & Virtual University Business Case. Assume that you are the executive who has to make a funding recommendation for the project to the capital budgeting committee (source of capital funds for all projects). Write a brief memorandum addressed to the project sponsors (Christopher Martin and James Cameron). Convey to them any questions, insights, or recommendations you have for their proposal.*

We open the class session by asking for an assessment of the Consumer Products International HR Intranet case. The students are usually quick to surface the problems with the case and some will recognize some of its merits. These can be boarded under categories of strengths and weaknesses. I then ask for a show of hands regarding who would fund this proposal and ask them to defend why. This provides an opportunity for a substantive dialogue *among* the students regarding the merits of the business case.

At this point, a mini-lecture on the role of business cases in funding IT investments is helpful. We also describe the three F's for arguing the business case (and caution against using the forth F – *fiction*). Appendix B provides an outline of this mini-lecture. This mini-lecture provides students with the background for the following in-class exercise.

After teaching about the three Fs, a collaborative learning exercise using the two cases can reinforce these points. Have students work in pairs to first review the CPI case, and if time allows, to proceed to the Biogenetica case. They should use colored high-lighters, pens, or other markings to code actual arguments of fact, arguments of faith, and arguments of fear as they appear in the two business cases. This exercise really presses them into the details of the organizational situation and forces them to realize how arguments can sometimes be interpreted differently.

Most student groups are very ready to discuss some of their findings. We usually direct a discussion of the CLE that clarifies the students' insights from their interaction. It is sometimes helpful to board these comments or to look a one or more arguments and then talk about how they might be perceived differently by different readers (e.g., Chief Financial Officer, Line Manager, IS Director, etc.).

The remaining 20 minutes of the class is devoted to discussing the specifics of the Biogenetica business case and contrasting the two. The students will benefit from some concluding remarks to reinforce the purpose of writing business cases and the need for differing emphases on arguments of facts, faith, or fear depending upon the situation of the system being proposed.

Epilogue

Students will, of course, ask if the proposals were actually funded in their respective organizations. The answer is yes. At the time of the case writing, both companies had committed funding and initiated IS projects based on these proposals.

Memorandum

To: Christopher Martin and James Cameron
From: Student
Date: xx/xx/xx
Subject: HR-Intranet Business Case

_____

Having reviewed the business case regarding the CPI HR-Intranet & Virtual University, I have a number of serious concerns which I would like to share with you.

I must say up front that I do not believe the concept of the project to be without merit or benefit to the business. It is quite possible, in my view, that you have identified a concept that will not only bring benefits but may cause us fundamentally to redefine our approach personal development in the company.

If this is indeed the case and we wish to change the foundation stones of some of our key processes, we have a greater responsibility than is normally the case to show that we are likely to succeed. We cannot rely on a "leap of faith" but have to provide a chain of structured and coherent reasoning, supported by logic, analysis or educated guesswork. This Leads the reader to the conclusion that the project benefits will be gained, the costs will be justified and the risks managed.

In its present form, unfortunately, I do not see the required reasoning in this business case, nor do I do not see the supporting logic and analysis and I am left unable to form the required conclusion. I am therefore unable to support the request for funding and will remain unable to do so as long as my concerns are unresolved.

As illustrations of my concerns, please consider the following:

Lack of Coherence between Problem and Solution

Section 1.1 of the business case identifies the core business problem as a lack of integration between HR systems, leading to wasted time/effort in inputting and retrieving information, information inconsistencies and an unwillingness to update the functionality of what are perceived as outdated systems.

Yet in the rest of the document this lack of integration is barely mentioned and its solution is in no way offered as the basis for the project justification. No detailed analysis is offered about how the Virtual University concept will solve these integration problems in anything but the broadest terms and the benefits of solving these problems are not made clear.

This leads me to ask the following.....what problem are you trying to solve? Is it the lack of integration and, if so, why does this not figure in any of your argumentation outside of section 1.1? Or is the solution of these problems so insignificant that they do not merit mention? And if this is the case, what is the fundamental bedrock of this project? Or is it that the project started out talking about fixing an integration problem and then got taken over by seductive technology offering all sorts of possibilities, in which case would the business case not be better addressed Section 1.1 at identifying how the lack of the Virtual University disadvantages us as a company?

The Magnitude of the Business Change

Even if we ignore the above and accept the solution as proposed, the project would bring about fundamental business changes, the success of which the document seems to take for granted. To take a few of the more evident examples, the project would replace physical training courses with interactive or

distance computer-based training, it would put in place a network of Virtual Mentors and it would devolve the matching of courses to candidates away from HR into line management.

All of these are radical and completely untested departures from anything we have done before. This is, of course, not to say that they are wrong *per se* but simply that we have no idea at all what they mean for us, how we will make them succeed and the effects they will have on our organisation or people. We have no idea even if we believe they are the right strategic direction for us. That the business case offers no analysis beyond telling us that they will happen is a leap of faith that I am simply not prepared to take. I must admit that I am surprised that HR is prepared to sponsor this initiative when its relationship with staff members may be so fundamentally altered and is so little analysed.

Options for Consideration

Under any circumstances, but particularly in the context of my comments above, I would have expected to see many more business and technical options laid out for potential ways forward. I simply cannot believe that the Virtual University/Intranet solution is really our only option apart from doing nothing. What about options to address just the integration issues laid out in Section 1.1 without the Virtual University? Or maybe an option to address the key ADDC and T&D integration only? Or an option to implement interactive learning via an Intranet first and then to add other applications on to it in a step by step manner? Obviously it is not up to me to tell you the options, I merely attempt to illustrate that there are clearly more than the one identified in the business case (other, of course, than the "do nothing" option)

Cost and Timescale Estimations

To be frank, I find the cost estimates given in Section 3.3 and the Implementation timescales given in Section 3.8 as simply not credible. The document contains no rationale for these items, no estimating logic, no explanation and no substance to support them. Even in the absence of the other concerns I have about this project proposal, I would recommend that any funding be put on hold until the reality of these estimates can be justified.

Benefits Estimation

I regard the benefits estimation in the business case as wholly inadequate.

In the area of tangible benefits, I can see no rationale behind the figures presented and no reason to believe them credible. How have these figures been arrived at and how can we be confident we would achieve any or all of them? Additionally, how does the table in Section 3.4 square with that in Section 4.3? How can the projected savings be greater than the current costs and if the current costs are actually much higher, why are these not shown?

Also in the area of intangible costs, can we not try and quantify some of the items listed? Even as I type this it seems obvious to me that if we know how much re-keying of information is done, how long it takes, who does it and how much they cost us, at the very least we can try to put a figure against the Systems Integration benefit, at very least. I am certain that with more thought we can make an attempt at some of the others, as well

Summary

I wish to repeat that I am not doubting the potential worth of the proposed solution. I am arguing that the business case simply does not meet the burden of proof that it seeks to reach in proving that investment of the companies funds in this project is justified. This would give me concern in any project but gives me grave concerns in this project, which seeks to change fundamental aspects of how we develop our people (who after all are our most important asset). Under these circumstances, the burden of proof is that much higher and our standards of research and argument need to be that much better. Until we reach that level and the burden of proof is met, I cannot support your proposal.

Appendix B: Mini-lecture on the use of Facts, Faith, and Fear

Why Write Business Cases?

- *Disciplined Exercise*
- –Make tacit assumptions explicit
- –Provides basis for allocating capital

- *Communication Tool*
- –Essential investment in building the relationship asset[2]
- –Defines what the project is (and is not) at its initiation

Three Bases of Argument: The Three Fs

- *Facts,*

- *Faith,*

- *Fear*

Arguments of Fact

- *"The system will eliminate the need for hiring two positions for an annual savings of $100K."*

- *Justify using hard data, quantitative, structured feasibility assessment*

Arguments of Faith

- *"IS is infrastructure. We need it to support our growth and stability."*

- *Justify by vision. Investment X will lead to benefit Y.*

Arguments of Fear

- *"If we don't do this we may be eaten alive by our competition."*

- *Justify by perception of events.*

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[2] See Roth, J.W., Beath C.M., & Goodhue, D.L., (1996). Develop Long-Term Competitiveness through IT Assets, *Sloan Management Review*, 38(1).

Consumer Products International Business Case

Project Name: HR-Intranet & Virtual University

Project Cost Centre: HR

Project Manager : John Martin / Roger Beckam

Project Sponsor : Christopher Martin / James Cameron

<Translated to English>

Table of Contents

1. Definition of Project:

1.1. Description of Problem

Currently, HR has several tools for aiding in the human resource development and training process, such as: PACD[3], The Training Centre, HR, Curriculum Vitae, D&T[4], FAS-Minus. However, there is no integration of these systems, which has resulted in a great waste of time for users and systems managers. Furthermore, the same information is entered several times into different systems. As a result of this lack of HR tool integration and the various forms of data entry, redundancy of information is constant.

The current environment does not contemplate any integrated tools for self-development support and encouragement, thus contributing to the high costs of training programs.

User difficulties may be listed in the following order:

- **Integration of platforms and systems**
  HR management functions is not integrated for our line managers.
  Major waste of time in collecting information necessary for every-day decision making.

- **Different platforms for different information**
  E.g..: The Training Centre in Lotus Notes, PACD in Visual Basic and Oracle, D&T in Oracle, etc.
  Difficulty in identifying the application that contains the information desired.
  Need to be acquainted with several different platforms.
  Lack of platform integration.

- **System Performance**
  Given the current volume of information, the platforms in use can no longer adequately handle system operation, due to the large number of potential users, as well as their geographic dispersion.
  System performance is much affected in some platforms.

- **Functionality**
  Maintenance costs of improving system functionality and performance are high and constant, and expected results have not been attained.
  Low Functionality and performance lead to Productivity Loss.
  Navigation between current system screens is always one way; i.e., users always have to go through all the screens in the system, even when they know that the information desired is on the last screen.

- **Modelling x Implementation**
  The D&T system was conceived with the purpose of organizing and managing the set-up and distribution of Program Development course groups. Nevertheless, since there is no integration with other systems, PACD in particular, the process of course group appointment, organization and management is been done manually; i.e., information on training needs is extracted from PACD, corrected (because course names inputted into the system often fail to correspond to the Company Training and Development Programmes, so that discrepancies have to be eliminated), and only then is D&T system information entered.

- **Meeting Development Demand**
  Approximately 50% of the annual demand for PACD and MDC appointments is not met, due to users' work place being too far away to enable them to be away from work and take part in D&T and formal cost reduction programs, which has an impact on the decrease of the number of programmes/year .

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[3] **PACD –** Performance Assessment and Career Development
[4] **D&T -** Development & Training

Given this situation, it becomes quite apparent that HR is wasting much time with routine tasks that could be optimized by better-integrated tools.

1.2. Brief Description of Project

The purpose of the project proposed by HR is to encourage employee commitment to an on-going self-development process and to the "Learning Organisation" culture, by making available new learning aids in a single computer environment based on Intranet technology, where services and tools for developing skills are fully integrated.

In order to fully meet skill development requirements, all Company employees should have access to text tips, on-the-job activities, World Wide Web sites, and so on, which they should be able to use at discretion. This new IT environment should offer new pro-active services and help all employees to develop themselves and their managerial skills. In such an environment, there should be a career-development mentor integrated into the new PACD system. This person will be in charge of identifying each executive's skill-development needs as specified by PACD and of providing him or her with references of books, video tapes, articles, and so on via e-mail, in a direct communications channel.

The Training Center Service should have a pro-active character; i.e., the Training Center Service should provide a "Virtual Publishing Consultant", updated and reflecting the newest books, video tapes, articles, cases, and so on available in the market, classified according to our managerial skills. The system should keep executives informed via e-mail about such new releases in the market.

In this same environment, executives will be able to obtain information about all company training programs, as well as to make on-line course applications for their subordinates. When in doubt as to the best path for self-development, they may also check the HR knowledge base available in this environment or consult with the career development mentor.

In order to offer greater time flexibility, cost reduction and to ensure the same quality of traditional training programs, this new integrated self-development environment should provide interactive training focused on the managerial skills necessary for new business demands and challenges. In these courses, executives will immediately realise what their development needs are in a given skill, because the courses will offer real-time assessment upon completion of each module and will suggest reference material to improve their development. Once a course is concluded, it will be automatically entered in the executive's CV.

This new on-line integrated self-development environment will also be extended to newly-hired executives, who will be introduced to the Company and its "Learning Organisation" culture.

The integration of self-development tools and services in a single environment will contribute to better planning and monitoring, as well as to improvement in result measurement and reduction in training costs.

1.3. Project Objectives

Overall Project Objectives	Strategic Objective
To implement a "Learning Organisation" Culture through new alternative policies and techniques in order to encourage self-improvement of employees.	To develop and co-ordinate the means to ensure the availability of trained human resources to tackle current and future business challenges.

Project Objectives	Business Strategies	KPI	Target
To speed up the process of skill absorption.	To ensure that perceived D&T requirements are adequately fulfilled	MDC and PACD forecast vs. achieved	100% within 3 years
Use of new educational technologies	Cost Reduction	% reduction over '98 Budget (TMD)	33%

Technical Objectives of Project	Business Strategies	KPI	Target
One-stop shopping for all HR Systems and Executive Tools, allowing: 1. Better performance 2. A user-friendly end-user front end 3. Availability	Maximization of use of new Learning Techniques	System's end-user evaluation	90% good and excellent

1.4. Project Scope

The purpose of Intranet-HR is to make available to users all the tools described below in a single environment. With just one password users will be able to access every development tool and service. Because it would be a single, integrated environment, access to any tool or service available would be possible from any point of the Intranet-HR.

PACD – The Performance Assessment and Career Development (PACD) system should be redesigned in order to solve current operational problems and be converted to the Intranet environment, in order to make it more interactive and integrated with the remaining Intranet-HR systems.
Characteristics:
- The Career Development Consultant should help executives to assess their subordinates' skills by providing references of updated materials.
- PACD physical-attendance course appointments should be automatically entered in the D&T system so that the next course groups may be formed.
- On-line enrolment in physical-attendance and interactive training programs.

Managerial skills – An Intranet managerial page will be created with detailed information on managerial definitions and positive and negative indicators.
Characteristics:
- Page broken down by skill.
- Materials
- Courses
- Interactive Training Programmes
- Tips
- Career Development Consultant
- Interlinked and interrelated matters.
- Word search tool.
- Access to other-HR systems.

Common Technical Skills – The purpose of this system is to make available all Company policies, standards and procedures, as well as topics for developing common technical skills. The Human Resources skills will be made available first, to be followed by other common technical skills.
Characteristics:

- Pages broken down by topics and skills
- Materials
- Courses
- Interactive Training Programmes
- Tips
- Career Development Consultant
- Interlinked and interrelated matters
- Word search tool
- Access to other Intranet-HR system.

Career Development Consultant – This managerial self-development support service will be based on the individual development needs specified in PACD.
Characteristics:
- Career development consultant, which should act through a direct communications channel with executives, always via e-mail.
- Information on individual development skills.
- Personalised self-development guidance.
- Reference to self-development products and services in the Training Center Service or available in the market.
- Information on products, services or on-line courses.

Interactive Training – Interactive training may be understood as encompassing every computer-based program the contents of which is made up of texts, exercises, simulations, learning assessment, and is aimed at conveying or developing a participant's specific skill. Employee course attendance will allow on-line enrolment.
Characteristics:
- Flexibility — the course can be taken at any point in time.
- Modularity — each module is presented separately so that employees can have more detailed information in their area of interest.
- Assessment at the end of each module and upon course completion.
- Automatic Curriculum Vitae entry upon course completion.

The Training Center Service – The purpose of the system is to make available services and an environment favouring self-development, on the basis of managerial, common techniques and business training skills.
Characteristics:
- Dissemination of information on new materials and media, such as books, video tapes, articles, business cases and so on.
- On-line newsletter on new products and services.
- Integration with the remaining Intranet-HR systems.

Corporate Integration – Its main purpose is to present the Company to newly-hired employees, by showing them the business areas, operational units, policies, standards, Learning Organisation culture, systems available for self-development, and so on.
Characteristics:
- Integration flexibility.
- Pages broken down by topic.
- Interlinked and interrelated matters.
- Word search tool.
- Also, search tool for easy research.

Partial Career Development Management – Its main purpose is to provide employees with information about the qualifications to be met in order to further their career in the company.
Characteristics:

- Pages are broken down by topics as listed below
    1. Key Skills by Level
    2. Job Role/Management Challenge
    3. Guidelines
    4. Skill Definitions
    5. Detailed Skill Descriptions

- Interlinked and interrelated matters
- Word tool search

Curriculum Vitae – Its main purpose is to act as a database for employees to enter their development histories, that is, the courses they have taken.
Characteristics:
- PACD integration so that, when defining the skill development plan in the PACD system, the assessing executive may access employees' CV's from PACD in order to check which training programs the employees in question have been engaged in.

HR Training Program – Its main purpose is to make a detailed presentation of Company training programs.
Characteristics:
- Course description.
- Course entry requirements.
- Date of next course group.
- On-line enrolment (to be made solely by the immediate superior of the executive appointed to the course).
- Upon on-line enrolment request in any program, the system will readily show the list of subordinates under the request originator.
- When requesting the enrolment of a given subordinate, the system will automatically check whether the appointed subordinate meets all the entry requirements of the training program in question and will inform the application originator whether or not the operation has been successful.

Other project products/functions –
- **FAQ's (Frequently Asked Questions)** – question-and-answer tips by subject.
- **What's New** (under managerial development) will show some of the latest news in managerial development, HR services and so on.

Processes involved	Changes after implementation	Areas involved	Systems affected
1. Performance Assessment and Career Development	- The performance assessment and career development system will undergo changes including: a direct link with with CVs and the D&T system will improve the process of determining the skills to be achieved and decisions to be made; a complete list of the training programs will be made available; a Virtual Mentor will guide employees in their self-development, on the basis of system-defined individual development needs.	All Company areas.	PACD, The Training Center, Curriculum Vitae, D&T
2. HR information system	- The Electronic Interactive System - HR will be redesigned and redefined as Common Technical Skills, with information on this kind of skills. Under Common Technical Skills - Human Resources, the system will show information from HR.	HR	HR
3. Training and	- The changes planned for the training and	All areas.	D&T, Curriculum

Development	development process include:		Vitae
	- the Virtual Mentor, who will guide and follow up executives in their self-development process (always via e-mail), and will become a permanent learning facilitator. - Interactive Training - breaking away from the classroom training paradigm; the Computer Based Terminal's main advantage is its flexibility, allowing executives to follow their own learning pace, without interfering with their daily tasks. - Appointing and enrolling in company training programs will be on-line processes, thus eliminating the current manual appointment process.		
4. Corporate Integration	- The corporate integration process for newly-hired employees will no longer be induced and will be managed by executives themselves, by means of an interactive hypertext system.	All areas	Integration Kit (brochures, leaflets, etc)
5. Curriculum Vitae	- The Curriculum Vitae system will be a valuable record of courses taken throughout the self-development process. Also, the system will be fully integrated with all other tools in the environment.	All areas	Curriculum Vitae, PACD, D&T, CBT
6. Partial Career Development Management	- This development tool will include fundamental information on qualification requirements for developing a career in the Company.	All areas	

Business requirements not met by this project:
- ◊ MgtWATCH integration.
- ◊ Data updates through MgtWATCH effected by executives themselves.
- ◊ Integration of MgtWATCH and Curriculum Vitae.
- ◊ Intellectual Capital system.
- ◊ D&T system update and/or conversion.

Company units benefited: All business units

Number of users: ≅ 2500 people

2. Alternative Solutions

In an attempt to find the best technological and business solution for the current lack of system integration between HR Development services and tools, alternatives are presented as specified below:

a) The Virtual University
b) Keeping the current situation unchanged

3. Alternative <A>

3.1. Description

The Virtual University is a single environment which will offer integration of self-development tools and services.

This alternative proposes developing an Intranet technology environment where HR Development systems can be integrated so as to give more efficient support to the skill development process, as well as to facilitate access to self-development systems and enable efficient monitoring of employee learning process.

This alternative will be made up of the systems described under 1.4 Project Scope.

3.2. Impact Analysis

3.2.1. Business Aspects

The purpose of the Virtual University project is to consolidate the "Learning Organisation" concept. In this way, as was shown above, several self-development resources will be made available. Thus employees are being made accountable for their own development and for partial management of their careers.

3.3. Project Costs (including first year of Support)

US$(thousand)

Resources	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
In-House Personnel	0	0	0	0	0
Contracted Personnel	US$ 202	0	0	0	0
Hardware	0	150	0	0	0
Software	0	0	0	0	0
Support	0	0	0	0	0
Others	0	0	0	0	0

NOTE.: Initial development costs only.

3.4. Quantifiable Benefits

The Virtual University will contribute to increase in productivity, since it will reduce the time spent by employees on physical-attendance training programs. Also relevant is the reduction of costs resulting from the creation of groups for physical-attendance courses.
Below is a table showing the benefits of the Virtual University.

US$(thousand)

Benefits	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
CBT/Mentor/Training Center		US$ 500	US$ 500	US$ 500	US$ 500*
PACD/CV		US$ 30	US$ 30	US$ 30	US$ 30

*HR budget savings, according to '98 Budget.

3.5. Non-Quantifiable Benefits

Benefits of this kind may be classified as follows:

- Systems integration
- Encouragement of Self-Development
- More efficient monitoring of skill development process
- Prompter meeting of D&T needs
- Equipment capacity: reduction of upgrading
- Easier and quicker access to HR Systems
- "Learning Organisation" image consolidation

3.6. Risk Analysis
Refer to Risk Analysis spreadsheet.

3.7. Investment Return Period (Payback) and Withholding Tax Calculation

The Payback was calculated using the NPV formula for a five-year period.
NPV: US$ 1,601.72

3.8. Implications / Implementation Flow

The project will be divided in two major parts:

i) The Virtual University
   The Virtual University environment will be developed with the systems that are within the scope of this project.

ii) PACD
   The system will be redesigned and implemented in the Intranet environment to allow operation from the Virtual University.

After approval of project, the first stage should be completed within 160 days and the second in 130 days..

4. Alternative <B>

4.1. Description

Should the current situation remain unchanged, the lack of system integration will imply the following drawbacks:

- **PACD** – It currently runs on a platform that no longer meets users' needs. It has no connections with other systems. The PACD-defined D&T plan is accessed via direct database consultations, and D&T course groups are manually appointed.
- **The Training Center** – The current system is insufficiently interactive, which makes access to information somewhat inadequate (e.g. in order to request material, the user has to perform ten operations).
- **Training Programs** – For a long time the Company has been incurring in high physical-attendance training costs, with no methods for checking whether they are efficient or not. The company has always been responsible for the managerial development of its executives. This results in extraordinarily high costs
- **Corporate Integration** – This is a set of institutional materials on HR products, policies and standards sent to newly-hired executives to enable them to learn about the Company. The inconvenience is that employees who are not executives do not have access to this materials kit, and in addition updating them is a slow and expensive process that involves copying graphic materials.

In short, the currently available tools can no longer meet growing corporate HR and Training and Development needs. Tools are not integrated, often leading to the entering of redundant material. Furthermore, the very performance of existing tools is affected, since they do not correspond to the current needs.

4.2. Impact Analysis

4.2.1. Basic Aspects

If the current situation remains unchanged, high maintenance costs, lack of tool integration, and productivity reduction will continue. And as the volume of processed information increases, the problem will grow worse.

4.2.2. Business Aspects

To leave the situation as it is would be totally inconsistent with the "Learning Organisation" strategic plan. In order to avoid this, an IT environment that supports, facilitates and fosters self-development is necessary.

4.3. Current Costs

US$(thousand)

Resources	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
In-House Personnel	0	0	0	0	0
Contracted Personnel	US$ 15	US$ 15	US$ 25	US$ 35	US$ 40
Hardware	0	0	0	0	0
Software	0	0	0	0	0
Support	0	0	0	0	0
Others	US$ 40	US$ 40	US$ 50	US$ 55	US$ 60

Below is the rationale for the current costs:

PACD Maintenance Costs	US$	7,000
D&T Maintenance	US$	5,000
Physical-Attendance Course	US$	500,000
Reworking: PACDxD&TxCV	US$	3,000
Total	**US$**	**515,000**

4.4. Current Costs

Non-quantifiable costs of the current platform and its systems are specified as:

- Low Productivity
- No encouragement of Self-Development
- D&T needs remain unmet
- Difficulty in monitoring skill development and assessing performance
- Underutilization of current equipment
- Difficulty in obtaining HR information

5. Recommendations

If business and technical objectives are taken into account, alternative <A> proves to be the one which best meets our needs. We therefore recommend its adoption.

Probability x Impact Matrix

IMPACT / PROBABILITY	Frequent 0.3<P<1.0 Value=3	Probable 0.4<P<0.7 Value=2	Improbable 0.0<P<0.4 Value=1	Impossible 0.0=P Value=0
SEVERE Value=3	Developers' **HIGH RISK**	**Experience** **Resource Availability**	**Product update/ installation**	**NO RISK**
CRITICAL Value=2		**Support Experience**	*MODERATE RISK* Supplier Deliveries	
MARGINAL Value=1		**Personnel**		
NEGLIGIBLE Value=1		*LOW RISK*		

RISK ANALYSIS

Driver Category	Driver	Impossible to Improbable (0.0<p<0.4) Value = 0 or 1	Probable (0.4<p<0.7) Value = 2	Frequent (0.7<p<1.4) Value = 3	Probability (0 to 3)	Impact (0 to 3)	Risk Level
			Probability and impact of drivers adversely affecting impact <A>				
Performance	Size	Small or divisible	Medium or partially available	Large or indivisible	2	2	Medium
Performance	Personnel	Available and skilled	Partially available or skilled	Not available and/or not skilled	2	2	Medium
Performance	Performance	Low degree of change	Medium degree of change	High degree of change	1	1	Low
Performance	Hardware	Sufficient and with backups	Some availability	No backups and use to capacity	1	1	Low
Performance	Tools	Known and assigned	Available, but not configured	Not available or unknown	1	1	Low
Performance	Developers' experience	Over four years	Two to four years	Up to one year	2	3	High
Performance	Support experience	Over four years	Two to four years	Up to one year	2	2	Medium
Performance	Integration	Simple and documented	Medium degree of complexity and knowledge	Complex and hard to manage	2	1	Low
Performance	Hardware availability beyond forecast	Site contingency server use	Machine contingency server use	Upgrade or new server purchase	1	1	Low

Costs	Size	Restricted scope	Restricted or segmented scope	Wide scope	1	2	Low
Costs	Resource availability	Available and sufficient	Subject to approval or partial availability	Insufficient	2	3	High
Costs	Applications	Stable	Some maintenance effort	Under on-going assessment	1	2	Low
Costs	Maintenance breakdown	Known criteria and tools	Criteria defined, but must be customised	No defined criteria	2	0	Low
Support	Environment documentation	Adequate	Some problems	Inadequate	2	1	Low
Support	Integration of areas	Low involvement or well-defined activities	Some indefinite points	High degree of integration	1	0	Low
Support	Initial stability	Low or unchanged	Brief interruption or down time	Quick or uncontrolled changes	1	1	Low
Support	Product update / installation	Low incidence	Some managed incidence	High incidence	2	2	Medium
Support	Technology	Known and Company available	Customisation necessary	Unknown or with no Company support	1	2	Low
Support	Personnel	Sufficient and qualified	Restrictions as to amount and qualifications	Insufficient and unqualified	1	2	Medium

Schedule	Financial resources	Sufficient and on-time budget	Restrictions regarding value and date	Questionable or inaccurate budget	2	2	Medium
Schedule	Suppliers delivery	On time	*Some delay*	Delayed	2	2	Medium
Schedule	Integration of IT areas	Availability in terms of time and numbers	Restrictions regarding personnel and time gap	Insufficient resources	2	1	Low
Operation	Site contingency	In-house and own resources	Outside site and resource provider	Non-existent	1	1	Low
Organisational	Operation	Available personnel and known operation	Defined accountability, despite some conflicts	Absence of standards and personnel	2	2	Medium

Action Plan for Option <A>

Driver	Risk	Description	Person Responsible	Duration	Risk
Developers' experience	**High**	Developers' Training on Saphire: 1. **Daily follow up, weekly project meetings** 2. **Negotiation with Compugraf for technology transfer** 3. **Contract guarantees as to resources allocated for project (Senior)**	**Mark White**	**1 month**	**Medium**
Resource availability Costs	**High**	**Negotiation with supplier**	**Mark White / Eric Coleman**	**1 month**	**Low**
Personnel	**Medium**	**Definitive project team allocation and training in development tool**	**Mark White**	**15 days**	**Low**
Product update / installation	**Medium**	**Greater incidence on IBT. Manageable situation, without major risks.**	**Mark White**	**After project implementation**	**Low**
Supplier delivery	**Medium**	**Definitive allocation of sufficient resources for project teams, development tool training, and weekly project follow-up meetings**	**Mark White**	**Before project inception and during course of project**	**Medium**

Support experience	Medium	Expertise acquired throughout project development	Mark White	During course of project	Low

Biogenetica
San Jose ITSA Replacement

Business Case

Business Sponsor:	**Brian Smith**
Project Manager:	**Ram Kumar**
Project Cost Centre:	**00417**

Business Case

Table of Contents

4. Management Summary

Background: This is a replacement project for an existing ITSA system that is no longer supported and is not Millennium compliant.

Recommendation: To evaluate two short listed suppliers and select the best solution. Implement during 1998. An ITSA replacement system will provide ongoing net benefit to BioGenetica.

Scope of Project: The replacement of the ITSA system in San Jose R&D. This includes process enhancements, but the aim is to deliver existing functionality.

Project Sponsor: Brian Smith

Project Cost: Circa 600 K
Detailed project costs are the output of Phase 2 of the project.

Tangible Benefits: The primary benefit is an ongoing headcount saving, the equivalent of 240 K. More details are shown within the document

Intangible Benefits: The ITSA is a fundamental part of, and supports, the Biotech Industry Alliance (BIA) Accreditation.
Improved ease of use, particularly for temporary/replacement staff.
Modern end-user environment (Windows 95/NT)
Improved Management control and reporting

Payback Period: $3^{1}/_{3}$ yrs

IRR: 23 %

Start/End Dates: Phase 1 – started.   End Dec 1997.
Phase 2 - start Jan 1998.   End Oct 1998.

Risks: The main risk is the complexity of the equipment interfaces and the automatic update of analysis measurements into the ITSA system.
The industry uniqueness of processing machines also poses a challenge, but should be manageable given that this is a replacement application.
The consequences of a delay in implementation, whilst these issues are addressed, is primarily a cost issue, although the current application may suffer Millennium problems in 1999. Therefore I would suggest that the replacement work starts as soon as possible.

5. Introduction

An Information Technology System Architecture (ITSA) is a computer network installed within a laboratory or group of laboratories to log samples, gather data automatically from analytical instruments, perform mathematical calculations, track sample progress, produce data reports for customers and provide a database of raw data for archival retrieval.

This document's purpose is to summarise the business case for a replacement ITSA for San Jose Biogenetica's Research and Development. It should be read in conjunction with the Business Requirements document.

6. Project Definition

6.1. Project Background

The current ITSA operating in the laboratories of the four sections of the Emerging Technologies Department (ETD) of R&D was installed some eight years ago, is a highly customised system that is no longer supported by its' supplier and is beginning to suffer breakdowns in both software and hardware. In the last three years budgetary requests for upgrade or replacement of the system have been denied or subsequently cut from the budget. It has now been identified that major elements of both the application software and hardware within the system and its network are not Millennium compliant. The system will, therefore, need to be upgraded or replaced as part of the Millennium exercise.

This opportunity will also be taken to improve deficiencies in the existing systems functionality which currently require a significant amount of management time on resolving operational issues. Additionally the management reporting available within the application is insufficient to monitor day-to-day operations.

Brian Smith has identified the need to replace this system and is the sponsor for its replacement.

6.2. Statement of Business Need / Requirements

A separate document 'Business Requirements' details the Business Requirements in more detail. They are largely based on current working practices although new functionality available in the latest releases of ITSA software will be utilised where it is appropriate to do so.

The original business justification for the ITSA included improvements in the efficiency and productivity of the various sections of ETD without increasing staff resources. It was also to improve the quality of the data produced by removing operator involvement in data collection and transcription. At that time it was envisaged that extra staff (minimum 3 people) would be required if the ITSA was not purchased.

Since the introduction of the ITSA we have seen improved efficiency, productivity and data quality. An example of this is that the number of tests per year identified in the original justification was 120,000 against an estimated 160,000 this year, **a 33% increase**. This increase has been achieved without extra staff and against a decrease in staff numbers in some areas, e.g. QC, have been reduced 5 to 3 people. It can be argued that the change in staff numbers (non take up of 3 people against ITSA installation and subsequent 2 loss) have provided a year on year saving of approximately $200,000 with increased productivity.

Three of the sections within ETD now have Biotech Industry Alliance (BIA) accreditation that is an essential requirement in acceptance of our data by regulatory bodies. The ITSA is an integral part of the operation, audit trailing and data validation of the accreditation.

If the current ITSA is not replaced and subsequently fails:

1. We would not be able to meet the current workload placed on the ETD sections.

2. We would not be able to provide the San Jose plant and other R&D facilities with timely data to fulfil their regulatory obligations.

3. We would not be able to provide the current support level to the various Divisions of R&D and thus to other departments such as Marketing.

4. We would have to revert to manual operations with the subsequent loss in productivity and the possible introduction of data transcription and manipulation errors.

5. To counteract 1, 2, 3 and 4 we would have to increase staff resources. It is difficult to estimate how many this would entail but based on the figures above could represent a yearly cost in excess of $200,000.

6. We would place our BIA accreditation in jeopardy and all our procedures and audit mechanisms would need to be re-written.
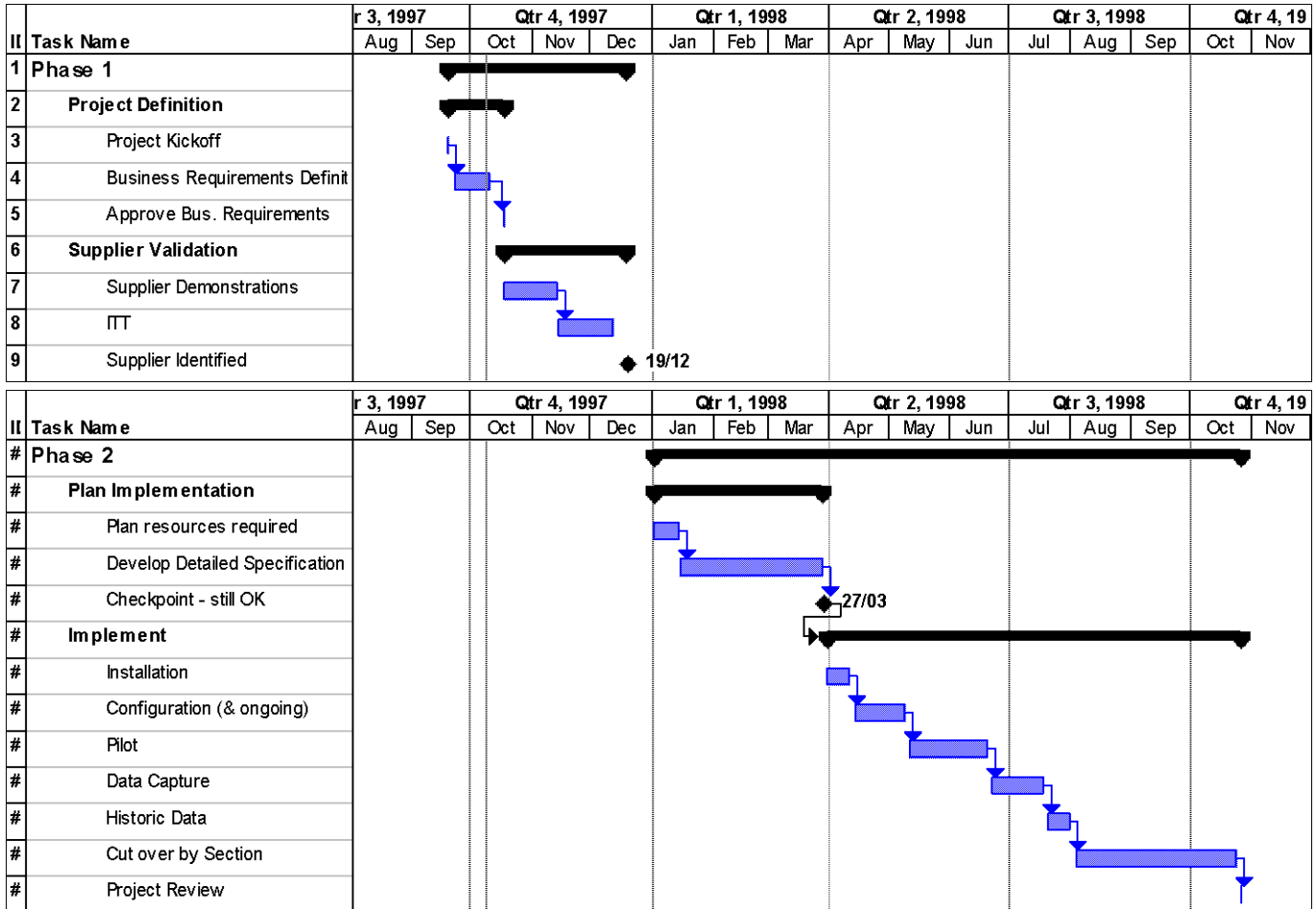

6.3. Objectives

The objective of this project is to implement a new/replacement ITSA system in San Jose by the end of 1998 which addresses the deficiencies of the current system. Disruption to the normal working practices in the labs needs to be minimised.

6.4. Project Scope and Timescales

The project Timescale is shown below:

II	Task Name	r 3, 1997		Qtr 4, 1997			Qtr 1, 1998			Qtr 2, 1998			Qtr 3, 1998			Qtr 4, 19	
		Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
1	Phase 1																
2	Project Definition																
3	Project Kickoff																
4	Business Requirements Definit																
5	Approve Bus. Requirements																
6	Supplier Validation																
7	Supplier Demonstrations																
8	ITT																
9	Supplier Identified					19/12											

II	Task Name	r 3, 1997		Qtr 4, 1997			Qtr 1, 1998			Qtr 2, 1998			Qtr 3, 1998			Qtr 4, 19	
		Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
#	Phase 2																
#	Plan Implementation																
#	Plan resources required																
#	Develop Detailed Specification																
#	Checkpoint – still OK								27/03								
#	Implement																
#	Installation																
#	Configuration (& ongoing)																
#	Pilot																
#	Data Capture																
#	Historic Data																
#	Cut over by Section																
#	Project Review																

The scope of this project is to select and replace the ITSA system in San Jose R&D. The first phase requires the selection of the supplier. Phase II will plan the actual implementation of the chosen ITSA and produce an agreed detailed functional specification (and costs), prior to configuring the product to meet exact requirements. This detailed functional specification will ensure that all requirements are met and identify areas which may need further work (e.g. customisation, which should be minimised). The checkpoint at the end of March provides the final decision point (functionality, benefits, costs, gaps).

In the unlikely event that the detailed functional specification shows that chosen solution is substantially deficient the selection of the solution would have to be revisited. Clearly the project sponsor would flag this to Operations IT for action and resolution.

7. Project Details

7.1. Project Costs (including 1st year support)

Project costs will be determined within the first phase of the project in conjunction with suppliers. A more detailed cost will be determined during the planning phase when the detailed functional specification has been written.

Phase 1 costs, excluding user time, involving Vincent Richards and Ram Kumar are 8K.
Phase 2 costs, met from a specific R&D budget, are estimated at 600K based on information obtained from other R&D ITSA implementations (e.g. a subsidiary like La Carte) and are comparable with the estimate below.

The main cost in the project will be the development and testing time for all the equipment interfaces to enable automatic update of the ITSA database with the results of analysis measurements. This costing allows for a detailed spec to be produced prior to implementation. If the Interface implementation proved to be easier than expected this cost might be halved, saving 80K

Phase 1 costs:	8K	
Phase 2 costs -		
Software Application costs:	150 K	30 users max
Software Customisation:	80 K	1 FTE
Hardware platform	20 K	Assume NT solution on Compaq
Interface software	20 K	
Interface implementation	160 K	2 FTE
Training of users	10 K	
New PCs / Mini Terminals	90 K	50 various items, inc printers
Project Management	70 K	1/2 FTE
Total Costs	**593 K**	USD

7.2. Tangible Benefits

These can be summarised as:

- Avoidance of additional headcount as indicated above (at least 5 people).
- Increased productivity (+ 33%) compared to no ITSA system, without an increase in headcount.
- Opportunities for a further productivity (at least 10%) to increase sample throughput with the existing headcount, e.g. by faster system response times and additional automation of equipment interfaces.
- Reduced management time on operational activities (repairing obsolete hardware, resolving system problems)

7.3. Financial Evaluation

The ongoing annual benefit from a ITSA system is a headcount reduction of at least 5 people. This equates to 200 K. Combined with the increased productivity (+33%) benefit which would add at least one additional full time resource, the total headcount cost saving is around 240 K per year.

Ongoing support cost (estimated at 15% of project h/w and s/w cost + 20% of IT resource) is 60K. This includes the partial time of existing IT resources, hardware and software maintenance. (The major project cost is not the hardware or packaged software solution)

The financial consequences of this project are shown below:

	1998	1999	2000	2001	2002	2003	2004	2005
Spend	-600	-60	-60	-60	-60	-60	-60	-60
Benefit		240	240	240	240	240	240	240
Net Benefit	-600	180	180	180	180	180	180	180

NPV =	**198** at	12% Discount Rate
IRR =	**23%**	
Payback =	**3.3** yrs	

The assumptions above are conservative i.e. taking the life of the ITSA at only 7 years. The previous ITSA lasted nearly 10 years. Increased productivity benefits have been omitted and the savings are restricted to the benefits already being delivered by the existing ITSA system, which will be improved on. Intangible benefits are, by definition, also ignored.

The above scenario ignores any cost of Millennium fixes. Although the current system could be fixed for Y2K problems the other deficiencies such as obsolete hardware, no support, etc, would not. Therefore this is not a realistic alternative as the ITSA system would need to be replaced in the next few years anyway.

7.4. Intangible Benefits

These are:

- The ITSA is a fundamental part of, and supports, the BIA Accreditation.
- Improved ease of use, particularly for temporary/replacement staff.
- Modern end-user environment (Windows 95/NT)
- Improved Management control and reporting

7.5. Risk Analysis

The complexity of the existing system poses a challenge in migrating the current functionality and equipment connectivity to a new system. This needs to be carefully planned with equipment potentially being connected in parallel to both the old and the new system.

The timescales outlined above are tight but achievable. The risk in this area can only be minimised by producing a detailed functional specification prior to implementation.

Sufficient user time needs to be devoted to the project to ensure that functionality is thoroughly tested prior to going live. This necessarily impacts the ongoing throughput and service levels in the lab particularly during the implementation phase.

The non-millennium compatibility of the existing ITSA and the belief that the date '99' has been used as a default in the system implies that the migration must be complete by the end of 1998. The ability of the system to function in 1999 should be tested as part of this project.

7.6. Sensitivity Analysis

As the benefit baseline is conservative the main risk is associated with an increase in project costs.
The analysis below shows that if the project cost increased by 20% the project would still have a positive NPV.
Again this scenario ignores Millennium issues, incremental Productivity gains, etc.

	1998	1999	2000	2001	2002	2003	2004	2005
Spend	-720	-60	-60	-60	-60	-60	-60	-60
Benefit		240	240	240	240	240	240	240
Net Benefit	-720	180	180	180	180	180	180	180

NPV =   **91** at   12% Discount Rate
IRR =   **16%**
Payback =   **4.0** yrs

7.7. Implementation Implications / Issues

The availability of laboratory staff is essential to ensure a full definition of requirements and a smooth implementation. One of the project sponsor's roles is to ensure that this expert user resource is available for testing, training, etc. There may be some opportunity to use temporary laboratory staff to free up full time staff.

Although Phase I involves nearly all internal resources it is envisaged that phase 2 will be staffed with contractors, either from the eventual software supplier or another third party. The project management role is key and although this role may be filled by internal resource, the use of an external resource is more likely.

7.8. Organisational Structure

The organisation of the R&D department is not affected by this project.