



Financial Management and Planning

Capital Project Appraisal

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Introduction

- This report presents a comparative analysis of two projects identified within the Engineering Stress team of Safran Seats GB (SSGB) to improve process efficiency.
- This report will present calculations and results of 4 of several capital investment appraisal techniques to compare the relative future success of each of these projects. This is intended to give guidance to the Head of Stress and Simulation in making decisions in investing on long-term funds (Weetman, 2013).
- Project appraisal tools used are Payback Periods, Internal Rate of Return (IRR), Net Present Value (NPV) and Profitability Index (PI), (UKEssays, 2020).
- This report also discusses any capital funding related issues and its impact on project selection.
- This report will also aim to discuss the non financial aspects of project appraisal which can have a direct/indirect effect on the projects future success and its choice for implementation.

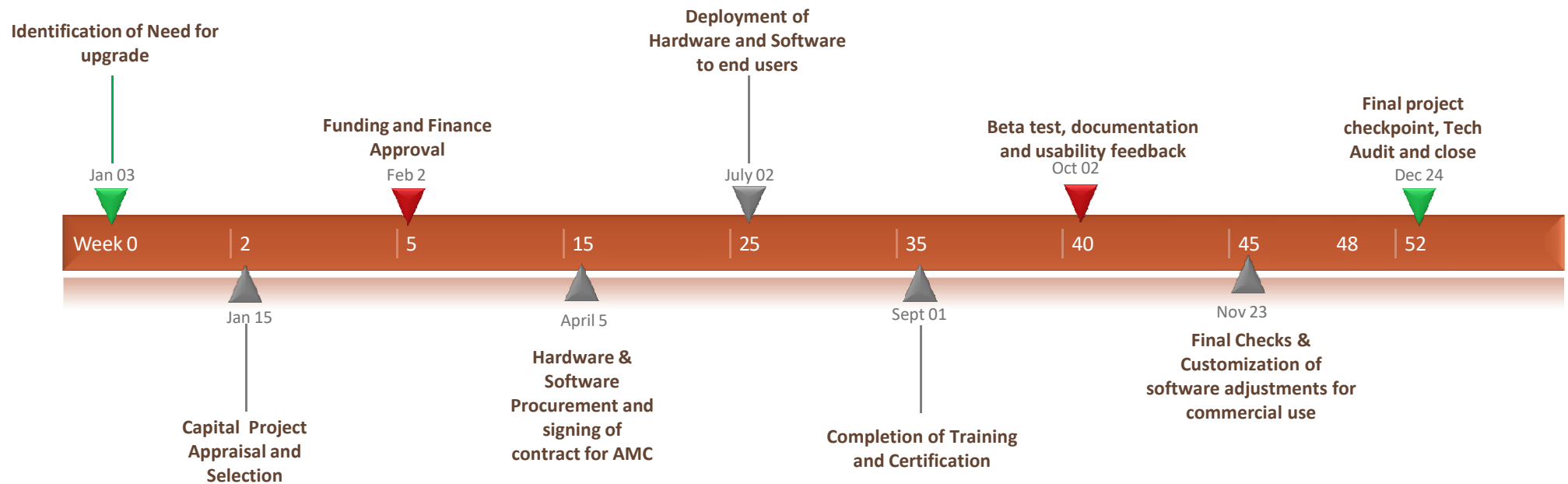
Purpose of the Project

IT System Upgrade for Stress Team

- Safran Seats GB's Mechanical Engineering (Stress) Department is using a certain type of suite of analysis softwares for design analysis by simulation, which it has been using over a decade and found to be obsolete.
- In view of the advancements in high performance and cloud computing, company is considering investing in a new computationally more advanced and efficient suite of software package to enhance engineering efficiency to reduce design cycle time and cost of engineering overhead.
- Engineering and IT department together have conducted a market survey of all the available software packages and shortlisted the 2 most relevant software packages (code named for the purpose of study as 'Project Altair' and 'Project Apex') for the type of work they carry out.
- The intent of this study is to carryout appraisal of Project Altair and Project Apex to select the most suitable of the two projects for capital investment and implementation.

Implementation timeline

Project Implementation Time Frame ~ 52 Week



Project Cost

NOTE: All Values based on an Estimated Average team strength of 20 stress engineers at any point in time

All costs in £ Sterlings

Particulars	Project Altair	Project Apex
Implementation/Fixed Costs		
Hardware & Networking	£100,000	£110,000
Software	£200,000	£250,000
Training	£4,000	£0
IT consultancy Charges	£12,500	£15,000
Data Migration	£5,000	£10,000
Sub-Total	£321,500	£385,000
Recurring Costs/Annum		
Annual Maintenance Contract	£20,000	£25,000
HPC / Cloud Charges	£5,000	£4,000
Tech Support	£5,000	£2,000
IT consultancy Charges	£5,000	£5,000
Sub-Total	£35,000	£36,000
Cost of Decommissioning		
IT consultancy Charges	£2,500	£2,500
Hardware Salvage Value	-£10,000	-£12,000
Sub-Total (Salvage/Residual)	-£7,500	-£9,500

- All recurring costs of this project are to be born within the allocated Annual **Capital Expenses** fund for the Stress Department.
- Implementation costs are to be drawn from the Infrastructure Improvement Fund for the SSGB business unit and/or from one or many long terms funded customer programmes. A decision on funding to be made based on down selection of the Software suite and ceiling on the Infra Improvement Fund.

Project Lifespan



According to (Tamai & Torimitsu, November 1992), average lifespan of any software is 10.1 years. This survey was based on 95 Samples and back in 1992. (Technologies, Mitopia, 2022) average software program lifespan over the last 20 years to be around 6-8 years.

As the time has advanced, the computational capabilities of modern computing hardware have multifolded and software are more efficient than before. Not to forget the High Performance Computing, neural networks, Cloud computing and advancements in semiconductor technology.

Considering these factors in mind, it is logical and practical to consider an average mechanical software lifespan of **5 Years**.

For the purpose of evaluation of project merits an average life span of 5 years is considered for both the projects. Either a major upgrade or a full replacement of the then in use software can be considered at the end of the 5th year tenure.



Implementation Challenges

New software implementation has following challenges to address and overcome

- **Resistance to change** from end users – creating awareness about the benefits on new software should help
- **Lack of skill to operate the new piece of software** – Proper training and on the job assistance should help
- **Risk of data loss during data migration** from one software platform to other – New/old software provider should be able to help
- **Disruption of work during migration work** – Management to be made aware of the disruptions and make arrangements
- **Financial challenges and funding** – Look for alternate funding options and request for raising the bar of Capital Expenses allocated for system and process improvement
- **Anxiety of Imminent Redundancy** – This software change should only improve ones efficiency at work and attract more work from within and outside, rather than increasing redundancy.
- **Existing hardware and network being insufficient for new software** – An estimation of what is needed for the implementation of new software should provide enough insight into the additional cost and add up to the project cost
- **System down time during migration** – this might hurt work efficiency if not planned property. Out of office hours and weekends are best suited for any migration activity which required systems to be down.
- **Capital loss on current infrastructure and wastage**



Capital Investment Appraisal Rational

Capital Project Appraisal tools and rational selected are as follows, (Sangwa, 2021):

- For initial scrutiny of both the projects, a **payback period** of not more than 2.5 years is desirable.
- A Weighted Average Cost of Capital (WACC) of 10% is assumed for Net Present Value (NPV) calculation considering the company and the projects are at medium risk of capital investment losses. A positive NPV is a must for a project to be chosen for implementation, (McLaney, 2006).
- Profitability Index (PI) is expected to be greater than 1.0.
- As the intent of the project is to improve the efficiency of the work force by up-skilling and reducing analysis cycle time, an **IRR** of at least 20% is expected from the selected project.
- Project with larger Benefit Cost Ratio (BCR) will have preference over the other.
- Only one of the two projects can be selected for implementation. Hence, a decision need be made based on the outcome of the appraisal process.

Project Model

- Cash flow per annum is calculated based on cash savings due to both the savings in machine time and man hours per year in comparison to existing set-up.

Machine time cost, per hour	£10.00					
Man time cost, per hour	£45.00					
Particulars	Man/Machine Hours			Avg. Tasks per annum (20 Enggs.)	Savings per Annum	
	Current Set-up	Project Altair	Project Apex		Project Altair	Project Apex
Bench-mark Linear Static Run time	0.5	0.3	0.25	150	£300	£375
Bench-mark Static Non-Linear Static Run Time	5	3	2.5	60	£1,200	£1,500
Bench-mark Optimisation Run	3	2	2	30	£300	£300
Bench-mark Explicit non linear Run	72	60	50	50	£6,000	£11,000
Bench-mark 2D shell mesh modeling and model setup & debug	16	10	12	120	£32,400	£21,600
Bench-mark 3D solid mesh modeling and model setup & debug	40	30	32	120	£54,000	£43,200
Bench-mark Explicit non linear model setup & debug	80	60	57	70	£63,000	£72,450
Bench-mark Linear Static Analysis Post processing	8	6	6	150	£13,500	£13,500
Bench-mark Non-Linear Static Analysis Post processing	12	8	7	60	£10,800	£13,500
Bench-mark Optimisation Analysis Post processing	12	8	7	30	£5,400	£6,750
Bench-mark Explicit Non-Linear Analysis Post processing	24	18	20	50	£13,500	£9,000
Sum Total of Savings OR Cash Flow Per Annum					£200,400	£193,175

Project Model

contd...

Project Altair

Investment	(321,500)					
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	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Savings		200,400	200,400	200,400	200,400	200,400
Less Recurring Costs		35,000	35,000	35,000	35,000	35,000
Decommissioning Costs/Income						-7,500

Cash Flows	(321,500)	165,400	165,400	165,400	165,400	172,900
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Net Benefit	-321,500	-156,100	9,300	174,700	340,100	513,000
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Payback Period

Breakeven point is between 1 and 2 years	-0.94
Payback Period (manual calc.)	1.9 Years

WACC

	10%
Denominator	1 1.10 1.21 1.33 1.46 1.61
Future Value	-321,500 150,364 136,694 124,267 112,970 107,357
NPV	310,153 POSITIVE

Profitability Index (PI)

	1.96
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Benefit Cost Ratio (BCR)

	0.96
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IRR (Excel Calc)

	43%
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Project Apex

Investment	(385,000)					
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	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Savings		193,175	193,175	193,175	193,175	193,175
Less Recurring Costs		36,000	36,000	36,000	36,000	36,000
Decommissioning Costs/Income						-9,500

Cash Flows	(385,000)	157,175	157,175	157,175	157,175	166,675
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Net Benefit	-385,000	-227,825	-70,650	86,525	243,700	410,375
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Payback Period

Breakeven point is between 2 and 3 years	-0.45
Payback Period (manual calc.)	2.5 Years

WACC

	10%
Denominator	1 1.10 1.21 1.33 1.46 1.61
Future Value	-385,000 142,886 129,897 118,088 107,353 103,492
NPV	216,716 POSITIVE

Profitability Index (PI)

	1.56
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Benefit Cost Ratio (BCR)

	0.56
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IRR (Excel Calc)

	30%
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Funding Options

Possible Funding options within the purview of SSGB are (developmentbank, 2022):

As the cost of implementation is well below half a million and considering the size of the group as a whole, it **is highly unlikely that the company will venture in to either the equity or debt financing.**

Would rather use one of the following capital investment methods.

Infrastructure Improvement funds→ Available, but access to these funds needs higher level of justification and can only be tapped once in a long while.

Capital Expenditure Funds→ Usually encompasses annual maintenance of IT and other equipments and do not form large enough some for one time investment. If the cost of capital can be spread over several years, this could be explored as an option.

Customer Profit and Risk sharing understanding→ Where large projects involving longer duration customer engagement is expected, customer can invest a certain percentage of capital for infrastructure improvement, such as in a new test and simulation facility

Leased and limited module software from software vendors: Where profitable to do so, software vendors can be approached to provide leased software licenses and modules to reduce initial capital cost.



Conclusion and Recommendations

Conclusions: Project Altair emerges as a clear winner of the two

- Both the project pass the criteria of minimum payback period of 2.5 years, have positive Net Present Value, IRR >20% as well as Profitability Index of over 1.0.
- Whereas, Project Altair is more desirable for investment due to the fact that:
 - Project Altair has the highest IRR of the two with 43% against 30% for project Apex
 - Project Altair has the least payback period of the two with only 1.9 years
 - Project Altair has a larger NPV as well as larger BCR of the two.
 - Although project Apex has not failed any criteria in specific, it may not be taken further as only one of the two is to be selected for implementation.

Limitations of the method and recommendations

- Advantage of Capital rationing could be considered as Project Apex is cheaper on Explicit Non-Linear analysis
- Current appraisal does not compare software security and system robustness as well as any human factors
- Technical comparison of the two software suites for their strengths, weakness, opportunities and threats has not been accounted for in this appraisal
- Equity or debt financing for capital funding could be considered on a business unit level due to the shorter lifespan of the project.



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Thank you &
Any questions
please?

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