

Annex D

Example case study

This is a case study of a hypothetical project. In the interests of brevity, much of the detailed justification that would be expected of a real-life submission has been omitted.

Outline business case

Identifying the need

1. The University of Atlantis is on the outskirts of the city. It is largely based on one campus but has accommodation on three other smaller sites within a five-mile radius of the main one. Sargasso House occupies one of these sites. It is a former office block which is rapidly reaching the end of its useful life and is becoming increasingly expensive to maintain. In addition, the building is badly configured, makes inefficient use of the space and has limited disabled access. The University of Atlantis owns the freehold of the building, which currently houses the Department of Pelagic Thaumaturgy. The main site is 15 minutes' walk away.
2. Pelagic Thaumaturgy is an expanding area of study, and courses are over-subscribed. The University of Atlantis has a high reputation in this field. However, because of the limitations of the building it is unable to respond to the increasing demand for places. As a result, it cannot take advantage of the potential income from overseas students, nor can it expand its range of services. The project has two aims:
 - a. To provide cost-effective and suitable accommodation for existing students.
 - b. To provide additional space for expansion of the department's activities.
3. The existing building provides 4,000m² of usable space. Providing an additional 1,000m² would enable the university to accept an additional 100 overseas students. There would be higher administration and staff costs, but the additional students would bring an extra net annual income of £180,000.

The strategic context

4. The overall strategy of the university focuses on a number of key aims which are relevant to this project:
 - a. The university has a commitment to become a regional centre of excellence. The provision of high quality, flexible space has been identified as key to its continued success.
 - b. The continued development of Pelagic Thaumaturgy is one of the key elements of the university's corporate strategy. The department has become increasingly successful and popular, and the university is now receiving national recognition for its work in this area.

- c. The university is committed to improving access for disadvantaged minorities, including people with disabilities.

Estates strategy

5. The key relevant objectives of the university's estates strategy are:
 - a. To provide a high quality environment for students and staff that makes the best use of its physical assets.
 - b. As a long-term aim, to locate all its teaching accommodation on or close to its main campus. One of the highest priorities within the strategy is expanding the space for Pelagic Thaumaturgy.
 - c. To recognise that any new accommodation should be suitable for current and planned requirements, but should retain sufficient flexibility to adapt to future changes as the shape of HE continues to evolve.

Key objectives

6. Accommodation needs to be:
 - high-tech, high quality and flexible
 - low maintenance, with reduced running costs
 - fully accessible to people with disabilities
 - close to or on the main campus.

Identification of options

7. A number of options to solve the problem have been identified:
 - a. Option 1: Status quo – carry out essential maintenance and repair works only. This is not seen as an acceptable option due to the extent of work required and the increasingly unsatisfactory nature of the accommodation. However, this option has been included to provide a base case against which to assess other alternatives.
 - b. Option 2: Major refurbishment of Sargasso House. Stripping the building back to its shell and carrying out substantial reconfiguration and refurbishment could deliver the level of quality and flexibility sought, but would not overcome all the restrictions of the building nor address the location issue.
 - c. Option 3: Demolish Sargasso House and rebuild on same site. Demolishing Sargasso House and constructing new purpose-built accommodation would deliver improvements in quality and flexibility. However, proximity to the main site would still

be an issue, and planning restrictions would mean that no extra floor area could be provided.

d. Option 4: Dispose of Sargasso House and purchase alternative accommodation. A search for alternative accommodation within a five mile radius of the main site has only identified one possible building (three miles from the main campus). However, it is virtually twice the size of the existing building so would probably only be viable if the university had a use for the additional space.

e. Option 5: Dispose of Sargasso House and lease alternative accommodation. The city contains a number of vacant office blocks, and there is at least one developer who is willing to refurbish one to the university's requirements.

f. Option 6: Dispose of Sargasso House and build new accommodation on another site. The city contains a number of development sites which the university could buy, on which to build a new building of the size it needs. However, none of the sites are any closer to the main campus than Sargasso House.

g. Option 7: Dispose of Sargasso House and build new accommodation on the main campus. There is potential to build on the main campus between two existing buildings, but space is restricted. Some reconfiguration of existing buildings used by other departments would be required, such as relocating entrances, and they would be denied all opportunities for further expansion.

h. Option 8: Dispose of all three satellite sites and purchase alternative accommodation. A possible building was identified under option 4 that is large enough to accommodate the activities from all three satellite sites. However, the other two sites currently operate quite effectively as satellite sites and do not suffer from the problems faced at Sargasso House. In addition the disposal value of these two sites is limited due to restrictions in use, so the proceeds of all three sites would leave a substantial funding gap for the university. This option was not pursued further, on the basis that it would run directly contrary to the university's long-term aim of consolidating its operations on or near the main site.

i. Option 9: Dispose of all three satellite sites and build replacement accommodation next to the main site. The current site could not accommodate additional accommodation of this size. Space next to the main site exists on a site already owned by the university, but because of an existing tenancy agreement this will not be available for another five years. A temporary arrangement would be required in the interim. The university recognised that this might be an option in the longer term but would not solve the immediate problem, so it decided not to pursue it further.

Initial option appraisals

8. Having discarded options 8 and 9, the seven remaining options were subject to an initial appraisal.

9. The financial costs and benefits of each option are set out in Appendix 1. There are a number of quantifiable benefits which accrue to one or more of the options:

a. Overseas students. There is considerable potential for recruiting additional students from overseas, which could generate a net income if they could be taught alongside the existing student body. Residential space would not be a problem, since there is a thriving local market in private rented accommodation. However, no teaching space can be provided for them on the existing site.

b. Postgraduate students. The department's ability to accommodate postgraduate students is severely constrained by the existing building. A new building on the same site would deliver more income from postgraduate teaching, and a building on any other site would allow still greater scope.

c. Contract income. There is a demand for contract research work which the department is unable to fulfil in its existing premises. A rebuild on the same site would allow part of this demand to be met, and it could all be met on another site. There would be additional running costs associated with this work, but a small net income.

d. Kiosk. The existing building contains a small book-selling and newsagents kiosk which provides a rental income. A new or refurbished building would allow a slightly higher rent to be charged; a development on the main site, which would bring in more business, would offer double the rent.

Discount rate

10. The university used a discount rate of 3.5 per cent in its calculations. However, it recognised that this rate made no provision for risk or optimism bias. At this stage it had not made a detailed assessment of the risks for each option. Past experience of earlier appraisals indicated that it had tended to underestimate the through life costs of new-build options by 20 per cent, the cost of refurbishment options by 10 per cent, and the cost of options to lease or buy a completed building by 5 per cent. It therefore applied appropriate adjustments for optimism bias to the results of the calculations.

Non-financial aspects

11. The university recognised that there are a number of other factors which might influence the choice of options. To structure the decision process, it carried out an appraisal of the non-financial aspects of each option, using a scoring system.

12. The university identified seven criteria against which to judge the options. These were:

- academic image, to reflect the standing of the Department of Pelagic Thaumaturgy
- flexibility, to provide scope to react to changing requirements in the future
- quality, to meet the need for a work environment of a high standard

- proximity to the main campus, in support of the long-term aim of bringing the university's estate together on one site
- continuity (lack of disruption) in the work of the department and other faculties
- timescale, to deliver an acceptable solution
- access for people with disabilities.

13. Each criterion was given a weighting, to reflect its perceived relative importance. Then each option was marked on a scale of ten for each of the criteria. The results of this exercise are shown in Table I, showing the raw (R) and weighted (W) scores.

Table I. Appraisal of non-financial benefits

Criteria	Weight	Options													
		1		2		3		4		5		6		7	
		R	W	R	W	R	W	R	W	R	W	R	W	R	W
Academic image	10	2	20	5	50	8	80	6	60	5	50	8	80	8	80
Flexibility	8	5	40	5	40	5	40	6	48	8	64	6	48	4	32
Quality	8	2	16	4	32	6	48	5	40	5	40	6	48	7	56
Proximity	8	4	32	4	32	4	32	2	16	6	48	6	48	10	80
Continuity	6	4	24	2	12	2	12	8	48	8	48	6	36	6	36
Timescale	6	8	48	6	36	4	24	6	36	6	36	4	24	4	24
Access	4	2	8	4	16	8	32	6	24	6	24	8	32	8	32
Weighted total			188		218		268		272		310		316		340

R = raw score
W = weighted score

Selection of the preferred option

14. The results of this initial appraisal are summarised in Table II.

Table II. Results of initial options appraisal

Option	NPV (£000)	Optimism bias (%)	Adjusted NPV	NPV relative to Option 1	Weighted score
1: Status quo	-8,695	0	-8,695	0	188
2: Refurbishment	-6,685	10	-7,354	1,341	218
3: Rebuild on existing site	-7,395	20	-8,874	-179	268
4: Purchase alternative building	-7,862	5	-8,255	440	272
5: Lease alternative building	-7,765	5	-8,153	542	310
6: New building on new site	-4,620	20	-5,544	3,151	316
7: New building on main campus	-5,103	20	-6,124	2,571	340

15. Table II indicates that options 6 or 7 offer the best overall value for money, so they were selected as potential preferred options for further investigation. However option 2 was judged to be worth further investigation as a lower cost alternative, and option 5 was retained in case any of the other alternatives proved not to be affordable in cash terms.

16. As a result of this initial appraisal, the university decided to pursue four options in more detail, to compare with the status quo ('do minimum') option. These were:

- option 2 – major refurbishment of the existing building
- option 5 – lease alternative building
- option 6 – dispose of Sargasso House and build new accommodation on another site
- option 7 – dispose of Sargasso House and build new accommodation on the main campus.

Initial assessment of affordability

17. The preferred options selected for further investigation show a positive NPV when compared with the status quo. However, to check affordability, the university needed to look at the associated cash costs. Certain elements of the option appraisal are not relevant in this assessment, notably the initial opportunity costs, and possibly the residual values. In any case, residual values need to be treated with caution since they are based on a very long-term prediction. In this case, the preferred options involve a significant initial capital investment. The

university has limited internal funds, and would almost certainly need to borrow to finance the capital expenditure. Therefore the preferred option cannot be properly assessed for affordability without considering the financing arrangements.

18. As a guide to affordability, the university looked at option 5, which is based on lease payments. The initial appraisal indicates that the annual cost of this option would be about £180,000 more than the status quo in a typical year. There would also be fitting-out costs in the first year, but the university's advisers indicated that it might be possible to negotiate an initial rent-free period to compensate. This option was deemed to be affordable within the university's existing operating budget.

19. If the university decides to pursue one of the other options, to refurbish the existing building or to build new, financing costs will have to be considered. This is an intrinsic part of developing the full business case, when alternative procurement routes will be investigated for all options still under consideration.

Recommendation

20. At this stage the Finance Committee was able to recommend the project to the Board of Governors, on the basis that there were options which appeared to be affordable and better value for money than the status quo. They based this recommendation on the fact that there was more than one option which appeared to offer benefits in financial terms, and on an assessment of the potential non-financial benefits. The Board agreed to support the project on the basis of the initial appraisal, and gave its approval to proceed to a full business case, However, it deferred a final decision until the full business case had been assessed.

Full business case

21. The project was developed in greater detail to explore the various procurement and financing routes available to the university, depending on which option it chose. At this stage, the lease option already had an identified funding method associated with it. However, the refurbishment and new-build options offered scope for alternative financing and procurement techniques, which might be combined in innovative forms of procurement such as PFI.

Potential for PFI

22. The potential for a PFI solution for the project depends on whether it can be expressed as a service requirement, in terms of an output specification. Obviously the core activities of providing teaching and research would remain the responsibility of the university. The main services in the project are the provision of space, and the ongoing maintenance and servicing of the building, including cleaning, security and portering. There is also scope to run a small element of peripheral services on a purely commercial basis, in the form of the kiosk for a bookshop and newsagent.

23. The option for refurbishing the existing building, and one of the proposals for new building, was as a stand-alone facility remote from the main campus. The university therefore accepted that an independent supplier might be able to offer a competitive alternative, and that it should explore a PFI option in these two cases. (Further advice on PFI, and on using a

soft market test to explore PFI options is available in the HEFCE's publication 'A practical guide to PFI for higher education institutions', HEFCE 98/69.)

24. For the new-build option on the main site, where the facilities would form an integral part of the existing campus, the potential for an external supplier to offer a competitive deal is much reduced. This is because the supplier would have to absorb the full cost of the service provision, whereas the university already operates on the rest of the site and can provide the same services at marginal cost. The university has a history of difficult industrial relations on its main site, and was reluctant to consider outsourcing some or all of its existing service provision there. For this reason, it decided that the new-build option on the main site was not an appropriate candidate for PFI. (*In real life, institutions will have to make their own assessment of such factors.*)

Other procurement options

25. To assess the conventional procurement options available to the university, it was first necessary to identify the criteria and constraints for the project. These included the timescale in which the space needed to be provided, the need to keep a tight control on costs, and the complexities of the location of the new building. However, the university was also aware that some of its members expected to see a high quality solution reflecting the standing and prestige of the department. The university already has a strong in-house project management team, which has recently overseen the completion of a student residence development, to time and budget. (Further advice on conventional procurement routes for buildings is available in 'Procurement guidelines for higher education: building and engineering projects'. This is produced by the Joint Procurement Policy and Strategy Group.)

Financing options

26. Because the university was considering conventional procurement options, and had insufficient reserves to meet the capital cost of a major building project upfront, it needed to investigate the availability of financing for the project. The university recognised the importance of securing the funding package before fully committing to the project. It sounded out a selection of leading financial institutions to assess interest in financing the project. This demonstrated that there would be sufficient interest in the finance sector to achieve a competitive deal, and confirmed that the university could borrow at a nominal rate of 8.0 per cent over 25 years. Its finance advisers assessed the long-term inflation rate to be 2.7 per cent, indicating that the university's real interest rate is 5 per cent. This rate was used to calculate the level of loan repayments in the following appraisals. (Note that the relationship between these rates is correctly expressed as $1.08/1.027 = 1.05$. The simpler calculation $8.0 - 2.7 = 5.3$ is only an approximation)

27. The university then undertook a more detailed appraisal of the following options:

- a. Option 1: Status quo – carry out essential maintenance and repair works only.
- b. Option 2a: Major refurbishment of existing building. To be undertaken by conventional procurement methods.

- c. Option 2b: Major refurbishment of existing building. To be carried out under a PFI contract.
- d. Option 5: Dispose of Sargasso House and lease alternative accommodation.
- e. Option 6a: Dispose of Sargasso House and occupy alternative accommodation.
To be built on a new site.
- f. Option 6b: Dispose of Sargasso House and occupy alternative accommodation.
To be carried out under a PFI contract.
- g. Option 7: Dispose of Sargasso House and build new accommodation on the main campus. The university normally uses design and build contracts for conventional procurement, to provide protection against cost increases during the construction period.

Shadow PFI bid

28. The true costs of a PFI alternative will not be known until a deal is struck, though the university would be able to get some idea when it starts to investigate the market. To estimate the costs of the PFI alternatives before reaching this stage, the university had to construct a 'shadow PFI bid'.

29. The shadow PFI bid is based on the assumption that a PFI supplier would face much the same capital and operating costs as the university. In reality one might expect a PFI supplier to achieve lower life-cycle costs from better integration of capital and running costs, or from taking advantage of other benefits such as economies of scale. In generating a shadow bid, the university made a modest assumption that these might total 5 per cent of the maintenance and utilities costs. This generates a slightly lower NPV for the PFI option when the same discount rate is applied.

30. However, the costing of the shadow bid also has to recognise that private sector bidders will require a higher rate of return to compensate them for the risks they bear in this form of procurement. The NPV of the shadow bid therefore has to be converted into annual payments which reflect this higher return. For this estimate, the university assumed that a private sector bidder would have to pay about 5 per cent in real terms for debt financing, since funders would see the same sort of risk in funding the project infrastructure whether it was built by the private sector or by the university. However the private sector would also look for a return of 30 per cent on the equity, which would make up 10 per cent of the total finance package. The shadow bid therefore assumes the bidder would require an overall return of 7.5 per cent (a weighted average of the two rates). By applying this rate of return to the NPV, the university can calculate the annual payments that a notional PFI supplier would require. Details are shown in Appendix 2.

Risk assessment

31. In developing this detailed appraisal, the university recognised that it needed to develop a more sophisticated approach to risk, rather than the simple correction for optimism bias

used in its initial outline assessment. The first step was to compile a risk register showing the key risks associated with the project, and indicating those which would affect each option. The list is shown in the table at Appendix 3. (This is a typical example, rather than a checklist for all projects. Developing such a checklist is an important early step in the project process, since it is one of the key pieces of information in assessing the relative merits of each option.)

32. The university then ascribed a probability of occurrence to each of the risk factors, using four categories: high (75 per cent probability), medium (45 per cent), low (25 per cent), or negligible (0 per cent).

33. For each risk factor, the cost impact was estimated. Combining the cost impact and the probability gives the risk value. The appropriate risk values were added to the costs of each option. A key factor was the allocation of risks. For instance, if the university undertook a straightforward refurbishment of the existing building, or built a replacement on a new site, and was responsible for all aspects of operation and maintenance, then it would need to cost the associated risks. If it adopted a PFI approach, then some risks would be transferred to a private sector operator and the costs would be covered by the unitary payments to the operator.

34. Appendix 4 gives the full appraisal of the options. In summary, the NPVs of the options are shown in Table III.

Table III. Summary of net present value (NPV) for each option

Option	NPV (£000)	NPV relative to Option 1	Weighted score
1: Status quo	-9,639	-	188
2a: Refurbishment	-8,411	1,228	218
2b: Refurbishment using PFI	-10,199	-560	268
5: Lease (alternative site)	-8,889	750	272
6a: New-build (new site)	-8,691	948	310
6b: New-build (new site) – PFI option	-9,609	30	316
7: New building on main campus	-9,059	580	340

It is clear that conventionally funded refurbishment (option 2a) is the most attractive option in financial terms, closely followed by building on a new site (option 6a). However, the balance of the weighted scores might well persuade the university to opt for the new building. Neither PFI variant appears particularly attractive – the advantages of a PFI solution depend on the scope for risk transfer, and in this particular project there is no very big service element.

Sensitivity analysis

35. The university recognised that there were other uncertainties which could affect the project. Two in particular gave cause for concern:

a. Given the politically volatile climate in the pelagic region, there is a serious danger that some of the income from overseas students might not materialise.

b. The rate of inflation might change. A conventionally procured option might be linked to fixed-rate finance. This would be vulnerable to a fall in inflation, which would effectively increase the real interest rate. A PFI deal would not be affected in the same way. PFI deals are typically index-linked. The unitary charge (the regular payment in a PFI deal) would rise to keep pace with inflation, and so the real cost would be unaffected. PFI deals can also be subject to regular benchmarking, so that they follow falling inflation as well, albeit not immediately.

36. Either variable could give rise to an affordability problem, as well as affecting the relative merits of the options under consideration. Both were subjected to a sensitivity analysis (see Appendix 5). The analysis was applied to options 2a and 6a as the two most attractive and viable options in financial terms. The results are summarised in Table IV.

Table IV. Summary of sensitivity analysis

Variable	Cost of options – NPV relative to Option 1 (£000)	
	Option 2a	Option 6a
Base case	1,228	1,116
Overseas student income halved	1,228	-284
Inflation falls 1%	828	-29
Inflation falls 1% and income halved	828	-1,261

37. The sensitivity analysis indicates that option 2a is more resilient from a financial point of view. Although some circumstances might reduce the relative NPV, it would still remain positive. The university would be wise to check that it is still affordable under these conditions.

Assessment of affordability

38. Before taking the final decision to proceed with this project, the university carried out a further affordability assessment based on the latest and more detailed costs, proposed procurement method and financing arrangements. In this particular example, a conventional procurement option was chosen, and it would be appropriate at this stage to explore competing financing options, to confirm that the university's initial assessment of financing costs still reflected what it could secure in the market.

39. If a PFI option had been chosen, the university would find it useful to carry out a soft market test, to confirm that the private sector takes a similar view about the viability of the project.

40. In a full assessment of affordability, the starting point is the institution's existing position, as if the project were not to be undertaken. The institution should base the assessment of affordability on its projections of income and expenditure, cash flow and balance sheet position, looking as far ahead as it can reasonably forecast. It will look at how the project affects all these areas, considering the cumulative impact as well as the incremental changes year on year. In the longer term it may be acceptable to consider the annual effects, but it should look more closely at the impact in the early years. For instance, if loan finance is used to undertake a project by conventional procurement, the institution may need to analyse the effect on its financial position month by month, having regard to the drawdown facilities of the loan.

41. In this case 10-year projections of income and expenditure, cash flow, and balance sheet position were produced for the selected solution, to confirm that the project was affordable in terms of both capital and revenue. It was confirmed that the annualised servicing costs of the new facility would take the total to 2.3 per cent of total income, still comfortably within the threshold set by the Financial Memorandum with HEFCE.

Confirmation of decision to proceed

42. With all the information available, the Board re-examined the case for proceeding with the project. It reviewed the non-financial benefits that would result, and understood the risks

and sensitivities inherent in the case. As in all cases where the underlying NPV is negative, it is ultimately a matter of judgement whether the university is paying a fair and reasonable price for the benefits that the project will deliver, particularly when few of these benefits can be expressed in financial terms. In making this judgement, the Board looked particularly at the changes from the status quo, and the relative costs and benefits of the options under review. Presenting the costs and benefits of each option in a structured way helps to establish that the final decision is based on a clear understanding of what the project involves, what benefits it will deliver, and why a particular option was chosen. The Board also needed to be satisfied with a clear explanation of how the project is to be financed, and how it can be afforded.

43. The Board examined the proposals for managing the project, to satisfy itself that the project was properly resourced. It also looked at the project plan, to get an assurance that it provided for regular reports to the Board on progress, and further consultation at key decision points.

44. With a full understanding of what the project entailed, the Board gave its approval to proceed. This approval was conditional on being advised of any significant changes in the assumptions underlying the appraisal.