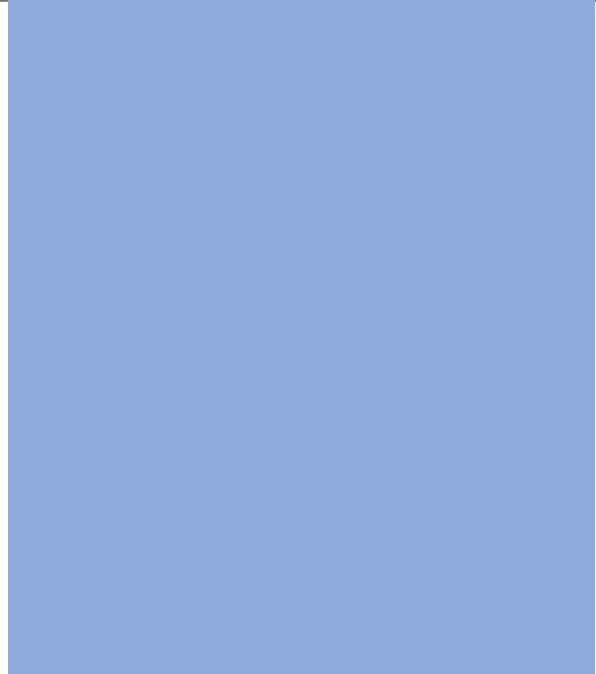




Financial Management

Assessment: Project Apraisal

Jennie Bull
Student number: 2114701



1. Executive summary

PetroStrat is a Stratigraphic Consultancy that provides a comprehensive suite of integrated geological services to the Oil & Gas industry, including biostratigraphic services which use fossil assemblages to interpret the age of rock. In the face of the changing world our industry is rapidly evolving and our aim at PetroStrat it to lead from the front in adoption of innovative digital approaches, utilising our existing expertise and adapting to reflect the needs of our customer base.

This project appraisal will discuss and evaluate the benefits and disadvantages associated with repurposing an existing revenue creating staff member, who has shown an underutilised interest in data curation and governance, to a full-time non-revenue creating role focused on improved data management for a secondment of 6 months. This role will improve efficiency associated with biostratigraphic data and business development across the business.

Considering financial impact in isolation this appraisal defines the most beneficial route forward being the onboarding of a dedicated data scientist alongside the original revenue creating role (option 3). However, the original suggestion of relocating an existing member of staff into this data role (option 2) is preferred when taking a holistic view of technical, economic, and social factors.

2. Strategic Case for change

As a senior nannopalaentologist (nanno) the individual is highly skilled in biostratigraphic theory, amassed 8+ years of experience and training in the identification of fossils. This role is revenue creating, including sample analysis and reporting. Over the course of the individual's tenure at PetroStrat they have become increasingly involved in the management of data, becoming a key user and trainer in biostratigraphic data management programs, notably StrataBugs. As PetroStrat has developed, it has accumulated significant data archives and, as we move forward into an increasingly digital space, improved management of this data has become crucial to the company's growth.

The existing nanno role has morphed to encompass a broad array of data stewardship expectations reducing efficiency of the nanno tasks (estimated 80% loss). As no dedicated time is available to implement more efficient data workflows these tasks result in little long term benefit to efficiencies. Lack of time allocation has led to deterioration of database curation, leading to inefficiencies in the general staff base. Although time loss is comparatively minimal per staff member, these efficiency losses compound across the 55 biostratigraphic staff members and 3 marketeers.

These inefficiencies alone provide a compelling case for change, however in addition, the long-term strategy and business model development at PetroStrat is reliant on digitisation. Improved understanding and curation of available data is a requirement if this business model innovation is to be successful, leading to new product development and increased revenues in future.

3. Options analysis

3.1 Option 1 - No nothing

The staff member will continue to generate revenue at reduced productivity. Improvements to efficiency workflows will be undertaken where time allows, although at a significantly reduced rate compared to Option 2 and 3, if at all.

3.2 Option 2 – transfer staff member from Senior Nannopalaentologist to Senior Data Steward for 6 months

Creation of a new role, Senior Data Steward, under the same investment (salary profile) utilising the individual's internal knowledge of both the discipline, software applications and data available. The role would initially be considered a 6-month secondment with potential to extend in line with business requirement, however for the benefit of this appraisal the individual reverts to nannopalaentologist and revenue creation in the 7th month. This option would not only retain the specialised biostratigraphic asset but develop an internal underutilised interest into a valid and formal skill.

3.3 Option 3 – hire external data stewardship

The staff member would retain their original position and the requirement for improved data stewardship would be sourced externally as a new hire. This option would require larger initial investment to secure a data scientist and significant onboarding to familiarise the data scientist with the physical and virtual infrastructure at PetroStrat (Carlucci, D., Marr, B., Schiuma, G., 2004).

4. Timeline and Lifetime

Timeline: initially financial calculations were derived from a 6-month project timeframe in line with the secondment term. However, as identified in Appendix A this timeframe does not sufficiently reflect the gains through improved efficiency. Instead, a 12-month project term is defined including the 6-months after secondment. This term has not been extended past 1 year, as projected costs associated with the data scientist in option 3 become highly speculative.

Implementation: strong business case for improved database curation has been identified in order to move forward with digital strategy. As shown in Christiansen's disruptive innovation theory, whilst the status quo may yield higher returns than adopting a new paradigm, any new approach will grow and far surpass the original state. If we remain inactive for too long our competitors will adopt these new paradigms and leave us in a position where growth no longer provides a financial benefit, rather a necessity. As such this project will be implemented as soon as possible. Potential limitations including the impact of losing a staff member from the nannopalaeontology department and training requirements. These issues have been assessed and can be overcome.

Lifetime: the assets created within this project are intangible non-current assets as they comply with the four characteristics used to identify accounting assets (Atrill & McLaney, 2017). These assets reflect the knowledge and training retained by the individual. As such the lifetime of this project is the time the employee's skill sets are of continued use to PetroStrat, or the individual remains with the company.

5. Financial case: Funding and affordability

5.1 Assumptions

Salary figures presented in Appendix A represent smoothed figures for the purpose of this appraisal. The increased salary of the external role (option 3) has been estimated at 150% of the original role reflecting trends within the employment market. Overhead rates have been estimated at 20% consistent with a range of 10% to 30% for SME's in UK.

Weighted average cost of capital (wacc): although PetroStrat does not use either a wacc or an IRR threshold, the finance department have suggested 7.5% to be used for this appraisal. We note this is a surprisingly low figure considering current inflation. The classical examples of risk and return being positively related i.e. increase return require increase risk (Atrill and McLaney, 2017) doesn't necessarily apply here as the risk associated with inaction (option 1), and a higher initial revenue over 6 months, reflects lower risk than option 2. Whilst the inaction of option 1 may have detrimental effects on the long-term digitalisation goal it is considered of comparatively lower risk and 5% wacc has been used to reflect this.

ARR & Depreciation: in order to utilise ARR as a model the value of non-current intangible assets, the knowledge held by the role, have been estimated as 3 months of salary, plus overheads. The residual value of option 2 is the median between options 1 and 3 reflecting the improved data knowledge available alongside the existing nannofossil specialism.

5.2 Costs

The line items associated with each of the 3 options are similar. Salary and overhead costs (20%). In addition, option 2 requires membership to training software, however training will largely be undertaken in non-work hours and no associated hourly rate has been included. Option 3 required onboarding which has been estimated at 2 weeks of salary costs. Detailed figures identified in Appendix A.

	Option 1	Option 2	Option 3
Investment (salary)			
Nanno/Data Steward Salary Cost per day	£200.00	£200.00	£200.00
Overheads per day (20%) *	£50.00	£50.00	£50.00
New Data scientist Cost per day			£300.00
Overheads per day (20%) *			£75.00
Work days per year	270	270	270
Total Salary (12 months)	£67,500.00	£67,500.00	£168,750.00
Additional requirements			
Subscription to data science course (annual)		£500.00	
Onboarding (2 wk salary equiv.)			£3,750.00
Total Investment (12 month)	£67,500.00	£68,000.00	£172,500.00

5.3 Benefits

Whilst there are many long-term benefits to improved data stewardship, attributing reliable financial value to these gains is not possible. As such gains have focused on the efficiency improvements which will be achieved by curating and governing data, see Appendix A.

PetroStrat maintains 55 biostratigraphic staff, all of whom interact with the data daily. Whilst the efficiency improvements are minor, less than 2% of staff time, this is compounded by the high number of staff. The improved efficiency effects on the business development and marketing department is comparatively greater but given the smaller number of staff not as impactful. These efficiency improvements will be staggered as projected in Appendix A, covering progression in early implementation. These figures also assume 100% work load availability.

5.4 Source of finance

Options 1 and 2 are expected to be sourced internal through retained earning as the wage bill will not vary. However, option 3 is a significant increase in the wage bill and as such financing this internally would potentially effect shareholder dividends or require rationing of capital. Whilst this role is theoretically divisible, i.e. onboarding a temporary contractor, the benefit of hiring a full-time role is considered more beneficial long-term. Instead, external finance sources should be considered. As the hiring of a data scientist will advance our understanding and utilisation of data in relation to green energy opportunities the financing of this role maybe relevant to innovation grants (UKRI - Innovate UK).

5.5 Financial models

	WACC	Payback (M)	Payback (Y)	ARR	IRR	NPV	PI	BCR
Option 1	5.0%	17.24	1.44	-0.72%	-5.18%	-21777.74	0.68	-0.32
Option 2	7.5%	9.95	0.83	11.87%	4.75%	35685.13	1.52	0.52
Option 3	7.5%	8.13	0.68	12.64%	7.77%	111175.67	1.64	0.64

The financial models referenced above reflect a 12-month time frame.

Option 1 is clearly not viable; payback far exceeds the project timeline and all additional parameters are negative. This leaves option 2 and 3. Option 3 has the lowest payback period and the IRR is in excess of the estimated WACC (7.77% vs 7.5%). Whilst this is a minimal margin, in comparison option 2 does not exceed the 7.5% wacc. This is concerning given the current state of inflation however the relatively short project timeframe slightly negated the concerns in future value cash flows. Whilst ARR, PI and BCR are all broadly comparable between options 2 and 3, option 3 is consistently superior. The NPV associated with option 3 shows a significant increase comparatively.

6 Discussion and conclusions

Taking only financial models into consideration, option 3 is clearly the preferable route. However, additional technical, social, commercial, and economic factors need to be taken into consideration.

Technical: whilst option 3 introduces a significant amount of formal training at cost, option 2 allows development of technical skill at a far reduced expense and development of an existing staff member with familiarity of the data architecture in use.

Social: change management will be a significant factor in moving forward with digital strategy. There are complex interplays between change management and either internal or external change managers. However, building on the existing respect and trust the nannopalaeontologist has built within the work force is considered more effective at driving change management than an external hire. Additionally, PetroStrat prides itself on championing it's staff. Recognising the skills of the existing nannopalaeontologist will reflect this culture and commitment to staff career progression. It will also improve the moral of the individual and mitigate any risk associated with loosing that member of staff and the knowledge assets associated with the role.

Commercial: there is a clear business case to move forward as quickly as possible. Defining an external role, interviewing, hiring, and onboarding associated with option 3 will significantly delay implementation of data stewardship tasks.

Economically: option 3 has significant improved outcomes but it does require a larger overlay. At this point in time this outlay is not achievable without significant delays to timeframes.

On balance, the factors described above, alongside the negligible difference in financial models, suggests option 2, not option 3, be the final recommendation.

Appendix A: Financial calculations**Appendix B: Presentation package****References**

Arnold, G . 2013. Essentials of Corporate Financial Management,, (2nd Ed). Pearson

Atrill, P. and McLaney, E., 2017. Accounting and finance for non-specialists. 10th ed. Harlow: Pearson Education Limited.

Carlucci, D., Marr, B., Schiuma, G.,2004 The knowledge value chain: How intellectual capital impacts on business performance, International Journal of Technology Management Vol. 27, Nos. 6/7, 2004

Christensen, C. M. 2015. What is disruptive innovation. Harvard Business Review 44–53

Dyson, J. R., and Franklin, E. 2017. Accounting for Non-Accounting Students, 9th Edition, Pearson

Fridson and Alvarez (2002) Financial Statement analysis; a practitioners guide.

McLaney, E.I. (2014) Business Finance Theory and Practice, (10thEd). Financial Times/Prentice Hall

Samset K, (2010) Early Financial appraisal making the initial choices

Weetman, P. (2011), Financial and Management Accounting, 5th Edition FT Prentice Hall

	Capital Investment Project Appraisal	Student: Jennie Bull Student number: 2114701
---	---	---

Company:	PetroStrat
Department:	New Ventures

Project:	Role Change - Senior Nannopalaeonologist to Senior Data Steward
Project Description:	This project appraisal will discuss and evaluate the benefits and disadvantages associated with repurposing an existing staff member from a revenue creation role to a non-revenue creating role.
Project Type	Project justification:
Requirement	In order to achieve long term goals of creating digital deliverables an improved understanding and management of data is required. This first step will improve the success of this business innovation.
Efficiency saving	Improved data management will allow efficiency savings and therefore time and cost savings from a large number of staff including biostratigraphers and marketeers.

Start date:

Options Analysis - Costs

	Option 1	Option 2	Option 3
Investment (salary)			
Nanno/Data Steward Salary Cost per day	£200.00	£200.00	£200.00
Overheads per day (20%) *	£50.00	£50.00	£50.00
New Data scientist Cost per day			£300.00
Overheads per day (20%) *			£75.00
Work days per year	270	270	270
Total Salary (12 months)	£67,500.00	£67,500.00	£168,750.00
Additional requirements			
Subscription to data science course (annual)		£500.00	
Onboarding (2 wk salary equiv.)			£3,750.00
Total Investment (12 month)	£67,500.00	£68,000.00	£172,500.00

*20% overheads estimated from the median of a typical range or SME's (10-30%)

Options Analysis - Benefits

Revenue creation	
Nannopalaentologist at 100% productivity	
Unit cost - sample analysis	£84.00
Sample per day	7
Revenue per day (sample analysis)	£588.00
Revenue per day (reporting)	£1,000.00
Work day per month	22.5
Total revenue per month *	£13,642.00
Nannopalaentologist at 80% productivity	
Estimated data management* (hr/week)	1.5
Work day per month (days)	22.5
Time spent on required data management (hr/month)	33.75
Productivity loss (%) per month	20%
Productivity loss (£) per month	£2,728.40
Total revenue per month (80% productivity)	£10,913.60

* figure based on an estimate of one billable reporting day per month with remaining time dedicated to sample analysis

Reduced Productivity (company wide)	
Biostratigraphers	
Biostratigrapher cost /hr	£33.33
Time loss per month /hr	3
Number of Biostratigraphers	55
Productivity loss (%) per month	1.78%
Productivity loss (£) per month	-£5,499.45
Marketeers *	
Marketeer cost /hr	£33.33
Time loss per month /hr	15
Number of Marketeers	3
Productivity loss (%) per month	8.89%
Productivity loss (£) per month	-£1,499.85

	Month					
Stagger in efficiency improvements (Options 2 & 3)	1	2	3	4	5	6
Biostratigraphers: New role tasks which will result in day-to-day efficiency saving will be prioritised, however there will be a delay in cost savings mirroring the time in role. In Option 3 this will also apply to the original nannopalaentologists efficiency	50%	75%	100%	100%	100%	100%
Marketeers: A large improvement in marketing efficiency will be achieved within a short time frame. However, subsequent improvements to reach those targeted here will evolve over the lifetime of the project.	50%	60%	70%	80%	90%	100%

Present Value

Option 1	Month												
	1	2	3	4	5	6	7	8	9	10	11	12	
Revenue creation (80%)	10,914	10,914	10,914	10,914	10,914	10,914	10,914	10,914	10,914	10,914	10,914	10,914	
Biostratigraphic efficiency loss	(5,499)	(5,499)	(5,499)	(5,499)	(5,499)	(5,499)	(5,499)	(5,499)	(5,499)	(5,499)	(5,499)	(5,499)	
Marketeering efficiency loss	(1,500)	(1,500)	(1,500)	(1,500)	(1,500)	(1,500)	(1,500)	(1,500)	(1,500)	(1,500)	(1,500)	(1,500)	
Total gains	3,914	3,914	3,914	3,914	3,914	3,914	3,914	3,914	3,923	3,914	3,914	3,914	
Option 2	Month	1	2	3	4	5	6	7	8	9	10	11	12
Revenue loss from Nannopalaentology	(10,913.600)	(10,913.600)	(10,913.600)	(10,913.600)	(10,913.600)	(10,913.600)							
Biostratigraphic efficiency gains	2,749.725	4,124.588	5,499.450	5,499.450	5,499.450	5,499.450	5,499.450	5,499.450	5,499.450	5,499.450	5,499.450	5,499.450	5,499.450
Marketeering efficiency gains	749.925	899.910	1,049.895	1,199.880	1,349.865	1,499.850	1,499.850	1,499.850	1,499.850	1,499.850	1,499.850	1,499.850	1,499.850
Reduced productivity saving from original role	2,728.400	2,728.400	2,728.400	2,728.400	2,728.400	2,728.400	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Return to original role (100% productivity)							13,642.000	13,642.000	13,642.000	13,642.000	13,642.000	13,642.000	13,642.000
Total gains	(4,685.550)	(3,160.703)	(1,635.855)	(1,485.870)	(1,335.885)	(1,185.900)	20,641.300	20,641.300	20,641.300	20,641.300	20,641.300	20,641.300	20,641.300
Option 3	Month	1.000	2.000	3.000	4.000	5.000	6.000	7.000	8.000	9.000	10.000	11.000	12.000
Continued original role revenue	10,913.600	12,277.800	13,642.000	13,642.000	13,642.000	13,642.000	13,642.000	13,642.000	13,642.000	13,642.000	13,642.000	13,642.000	13,642.000
Biostratigraphic efficiency gains	2,749.725	4,124.588	5,499.450	5,499.450	5,499.450	5,499.450	5,499.450	5,499.450	5,499.450	5,499.450	5,499.450	5,499.450	5,499.450
Marketeering efficiency gains	749.925	899.910	1,049.895	1,199.880	1,349.865	1,499.850	1,499.850	1,499.850	1,499.850	1,499.850	1,499.850	1,499.850	1,499.850
Estimated revenue from data science development. Arbitrary assumption of a £60,000 sale by the end of the 12 month period.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	60,000.000
Total gains	£14,413.25	£17,302.30	£20,191.35	£20,341.33	£20,491.32	£20,641.30	£20,641.30	£20,641.30	£20,641.30	£20,641.30	£20,641.30	£20,641.30	£80,641.30

Residual costs	Option 1	Option 2	Option 3
Arbitrary figure for residual costs reflecting the knowledge asset. 3 months equivalent investment is used as an estimate.			
Option 2 including uplift due to learned skills	£16,875.00	£21,093.75	£25,312.50

Option 1 - Original Role: Senior Nannopalaeontologist (reduced productivity)

Investment	

[illegible][illegible]

--	--

[illegible][illegible]

Investm

[illegible][illegible]

Timeframe: 6 month

	WACC	Payback (M)	Payback (Y)	ARR	IRR	NPV	PI	BCR
Option 1	5.0%	8.62	0.72	4.35%	-9.47%	-10632.91	0.68	-0.32
Option 2	7.5%	∞	∞	-16.05%	#NUM!	-47527.27	-0.39	-1.39
Option 3	7.5%	4.22	0.35	14.86%	7.29%	22774.32	1.26	0.26

Timeframe: 12 month

	WACC	Payback (M)	Payback (Y)	ARR	IRR	NPV	PI	BCR
Option 1	5.0%	17.24	1.44	-0.72%	-5.18%	-21777.74	0.68	-0.32
Option 2	7.5%	9.95	0.83	11.87%	4.75%	35685.13	1.52	0.52
Option 3	7.5%	8.13	0.68	12.64%	7.77%	111175.67	1.64	0.64

Present value table

Months	12
Years	1
Low risk Interest rate	5%
Interest Rate	7.50%

Months	Period	5%	7.50%
1	0.08	0.996	0.994
2	0.17	0.992	0.988
3	0.25	0.988	0.982
4	0.33	0.984	0.976
5	0.42	0.970	0.970
6	0.50	0.976	0.964
7	0.58	0.972	0.959
8	0.67	0.968	0.953
9	0.75	0.964	0.947
10	0.83	0.960	0.942
11	0.92	0.956	0.936
12	1.00	0.952	0.930

Financial Management Project Appraisal



Role Change:

From Nannopalaeontologist (revenue creation)
to Data Steward (non-revenue creation)

Student: Jennie Bull

Student number: 2114701

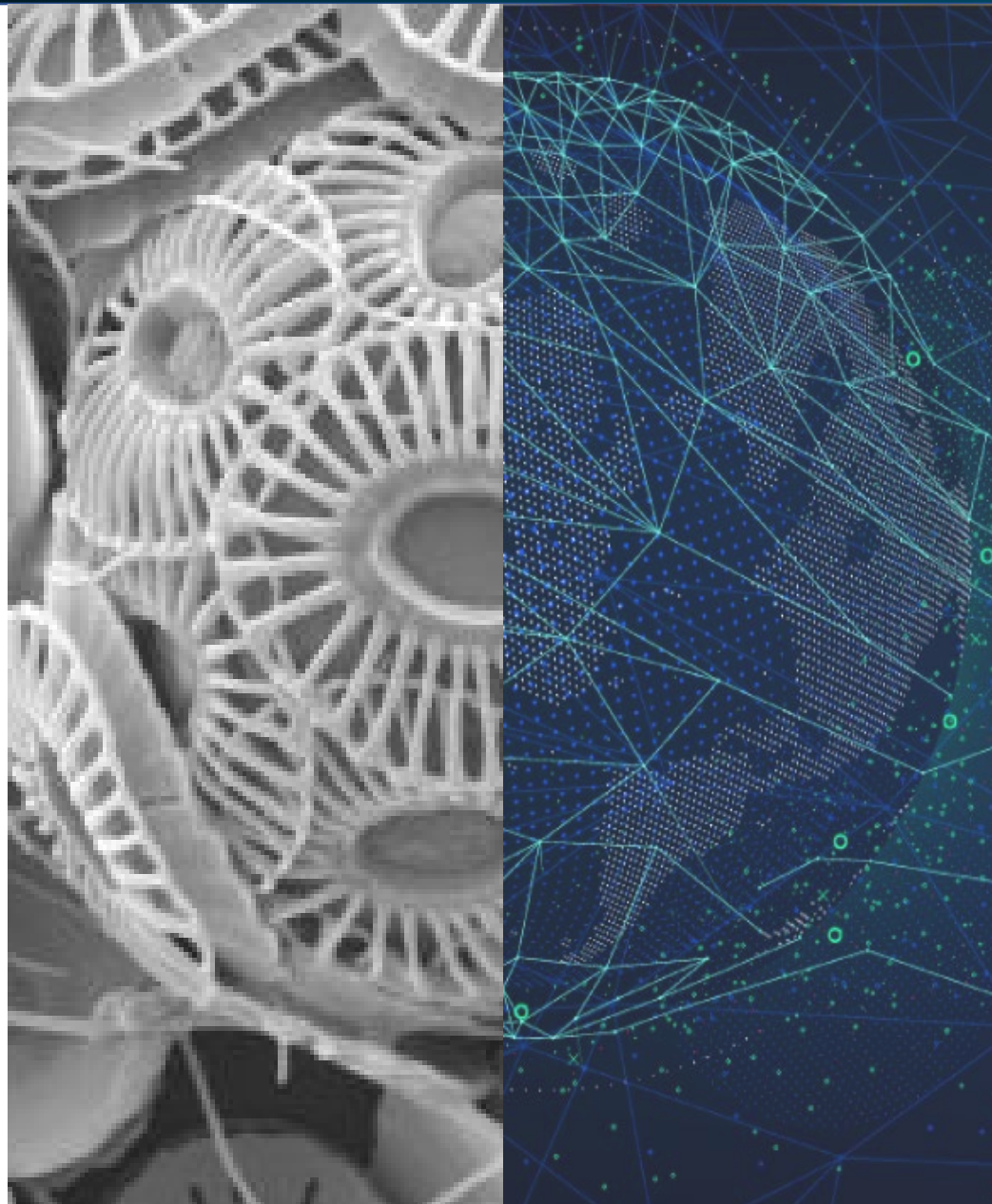


Case for change

petrostrat
applied stratigraphy



- Formed in 2001
- Initial focus in biostratigraphy (55 staff)
- Addition of Sedimentology and reservoir geology in 2014
- Acquisition of RPS in 2021
- Acquisition of PalaeoData (PDI) in 2022



- Improve efficiencies
- Better understanding of data available
- Improved utilization of data for training purposes
- Unlocking potential for new product development
- Improved understanding of data for marketing purposes.
- Preliminary steps in improving data management for future digitalization.

Options analysis

Option 1

DO NOTHING

Option 2

The nannopalaeontologist will convert to a data steward role for a secondment of 6 months.

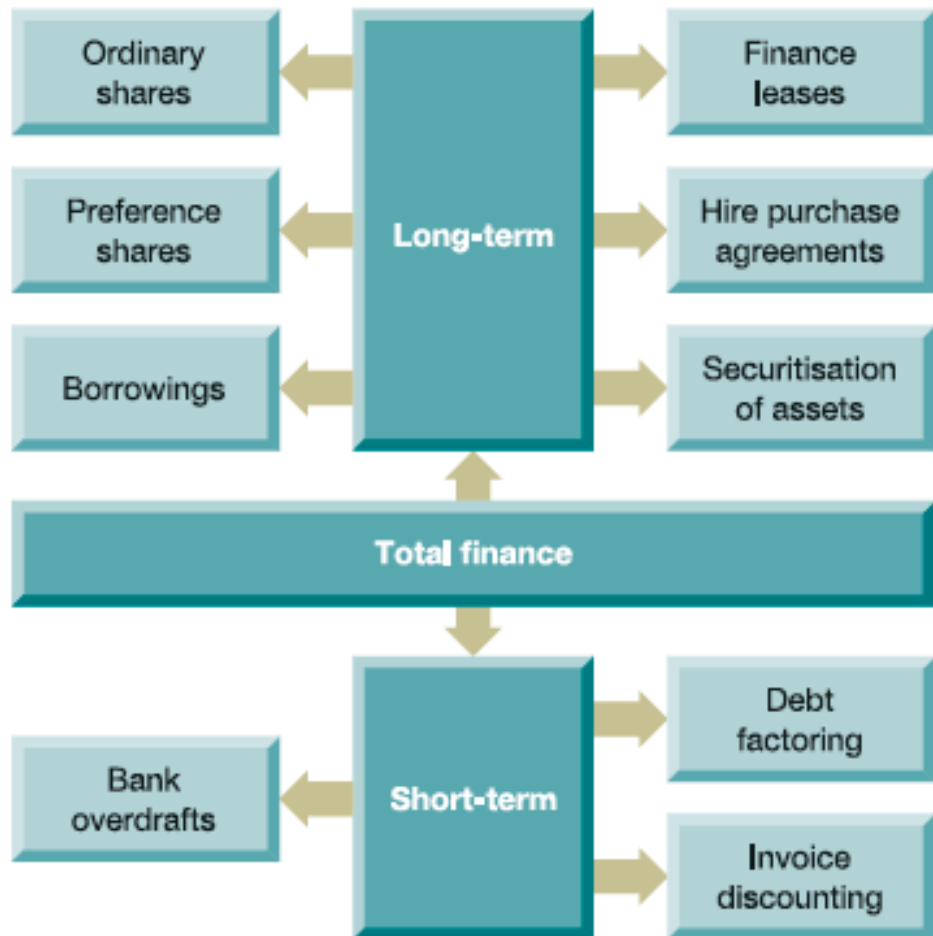
Option 3

Maintain the nannopalaeontologist in their current role and hire an external data scientist

Costs

Nannopalaeontologist Salary				Nannopalaeontologist Salary
		Data Steward Salary		
				External Data Scientist Salary
Overheads		Overheads		Overheads x2
		Training Requirement		Onboarding & Equipment
£67,500		£68,000		£168,750

Sources of finance



Sources of finance		Option 1 £67,500	Option 2 £68,000	Option 3 £168,750
Internal	Retained earnings	☒	☒	?
External	See image			☒
	Grants			?

Timeline and Lifetime

Timeline

- Months not years
- Secondment of 6 months
- Overall project timeline of 12 months

Implementation

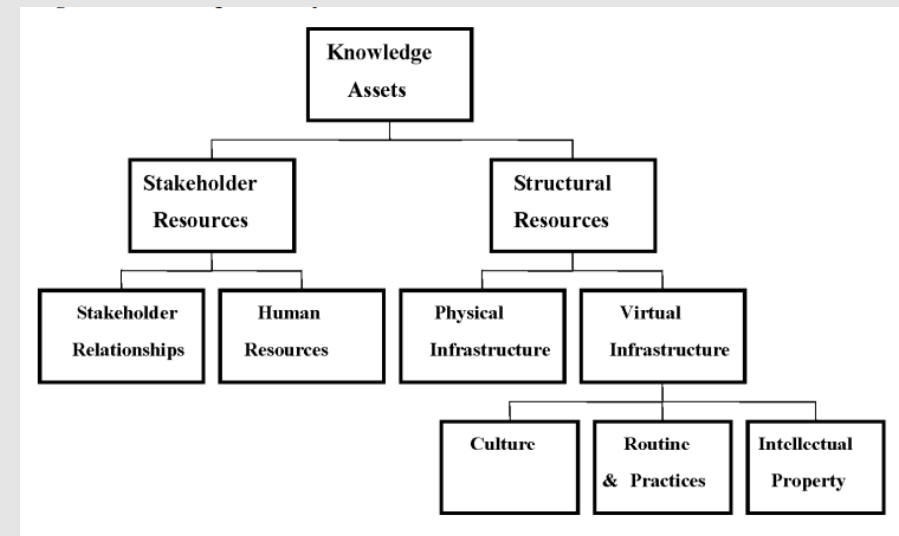
- Business case
- Training requirements vs onboarding
- Resourcing issues in Nannopalaeontology department.

Lifetime

Unique perspective of project lifetime, asset and residual values

What is the asset? Non-current intangible asset.

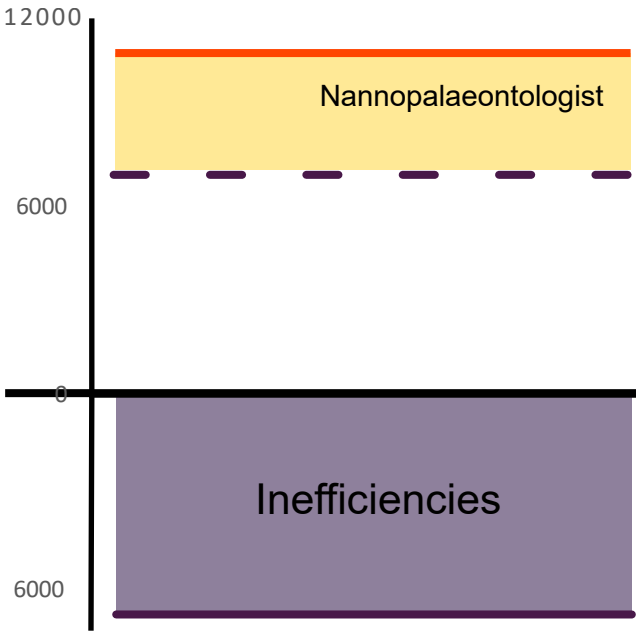
- Technical skills and knowledge assets



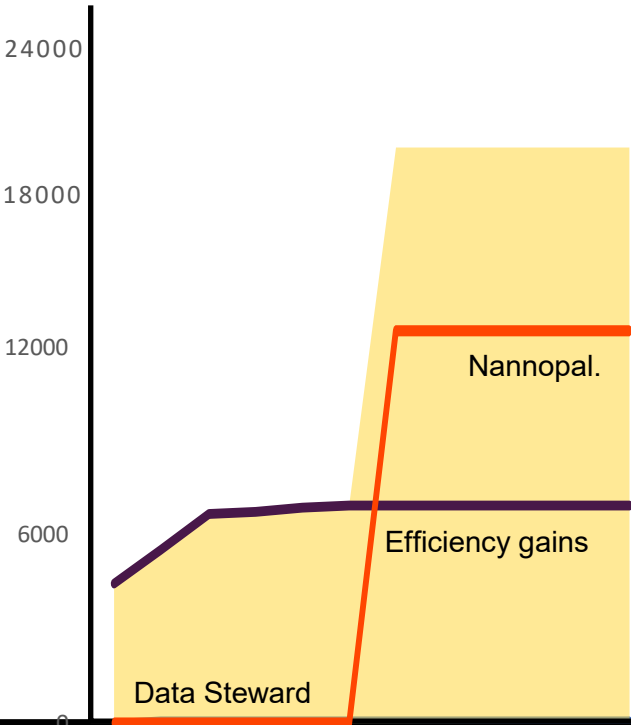
Efficiency outcomes

Option 1

- Reduced efficiency;
- Nannopalaeontologist
 - Company wide
 - Staggered rewards

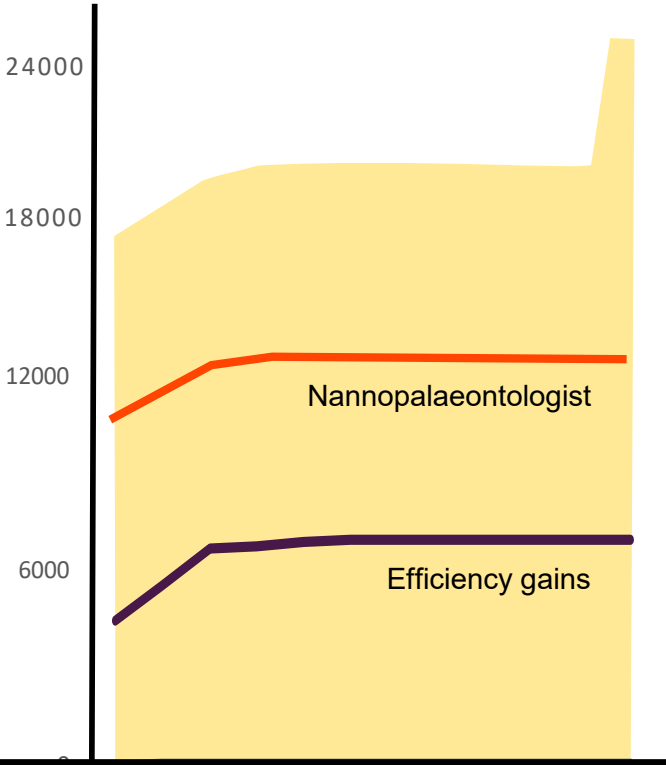


Option 2



Option 3

Data scientist revenue estimations ;



- The orange shading represents total cash flows.

Financial Models

Thresholds

PetroStrat doesn't use WACC
(7.5% suggested by FD)

Payback period of <2 years

Caveats

6 month vs 12 month

Variable WACC: low risk (5%) vs high risk (7.5%)

IRR calculation issues and ARR reliant on estimate of residual value.

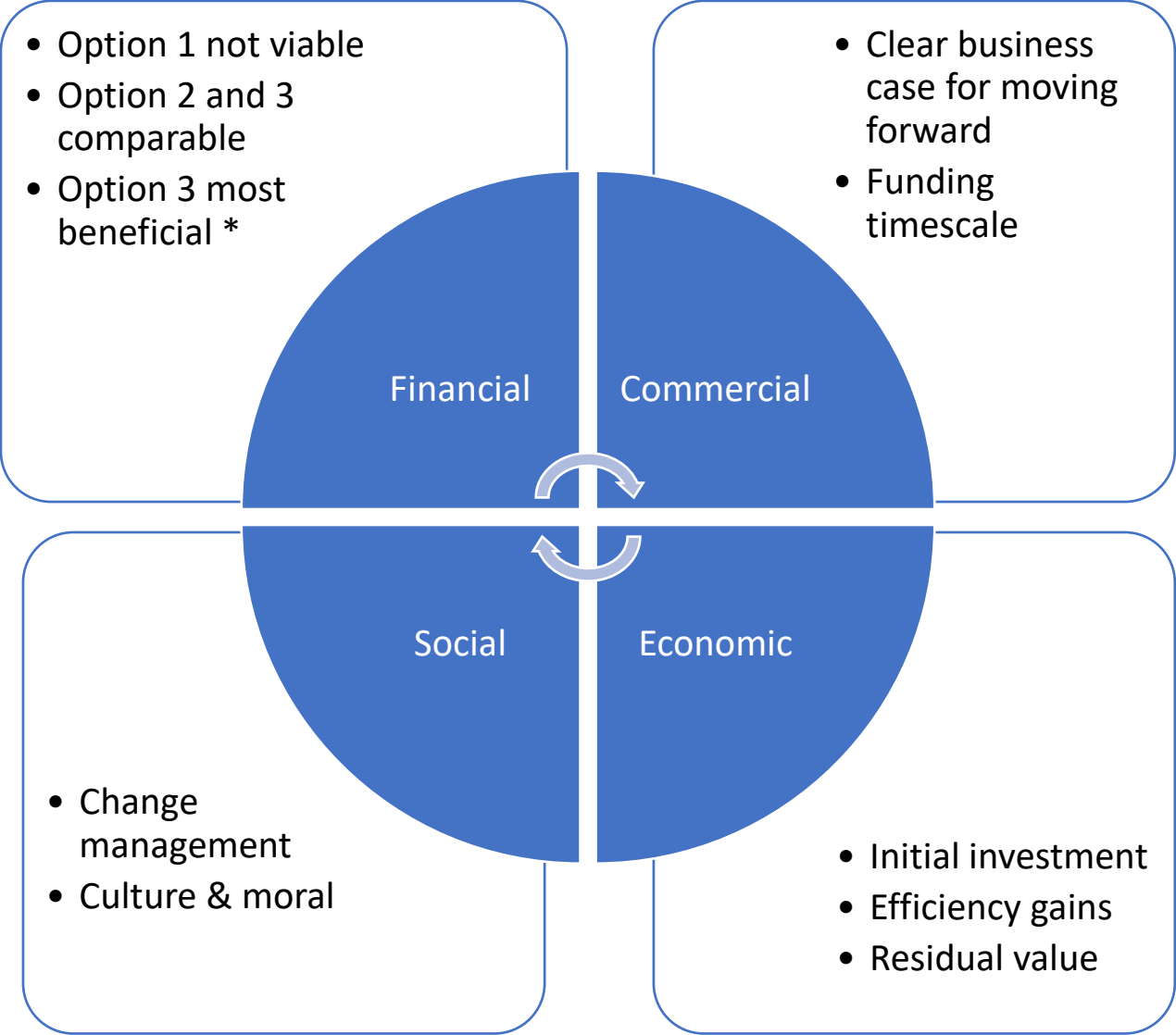
Timeline: 6 Months

	WACC	Payback (M)	Payback (Y)	ARR	IRR	NPV	PI	BCR
Option 1	5.0%	8.62	0.72	4.35%	-9.47%	-10632.91	0.68	-0.32
Option 2	7.5%	∞	∞	-16.05%	#NUM!	-47527.27	-0.39	-1.39
Option 3	7.5%	4.61	0.38	17.81%	10.03%	30772.67	1.36	0.36

Timeline: 12 months

	WACC	Payback (M)	Payback (Y)	ARR	IRR	NPV	PI	BCR
Option 1	5.0%	17.24	1.44	-0.72%	-5.18%	-21786.42	0.68	-0.32
Option 2	7.5%	9.95	0.83	11.87%	4.75%	35685.13	1.52	0.52
Option 3	7.5%	8.47	0.71	13.58%	8.49%	119174.02	1.71	0.71

Decisions and Conclusions



	Option 2	Option 3
WACC	7.50%	7.50%
Payback (Y)	0.83	0.71
ARR	11.87%	13.58%
IRR	4.75%	8.49%
NPV	35685.1315	119174.024
PI	1.52	1.71

Final recommendation

Option 2

In consideration of all variables this project appraisal considers the reduced financial benefit associated with Option 2 to be negated by the increase initial outlay of Option 3 and the social and cultural implications.

References

Atrill, P. and McLaney, E., 2017. Accounting and finance for non-specialists. 10th ed. Harlow: Pearson Education Limited.

Carlucci, D., Marr, B., Schiuma, G., 2004 The knowledge value chain: How intellectual capital impacts on business performance, International Journal of Technology Management Vol. 27, Nos. 6/7, 2004

Dyson, J. R., and Franklin, E. 2017. Accounting for Non-Accounting Students, 9th Edition, Pearson