

APPENDIX 5

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Date:

11:45 – 13:15 30/09/22

**Case for automated porosity
extraction from thin section
scanning technology**

Board Presentation

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Project Premise



Introduction to Whole Slide Scanners + review of techstack



Sunk costs and present timings



Payback schedule, NPV and IRR comparison between 3 options



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Project premise

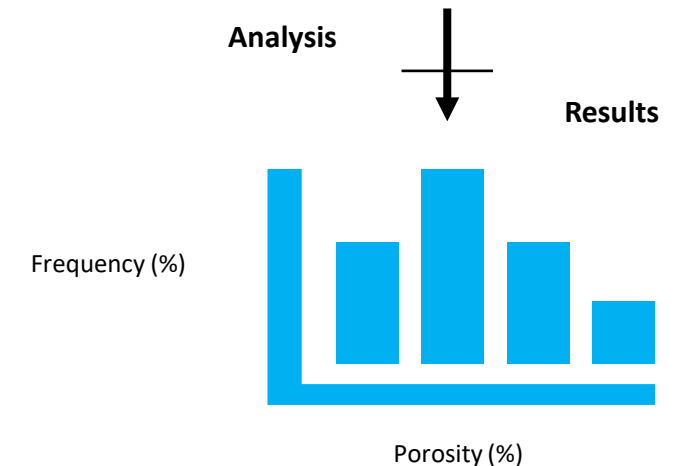
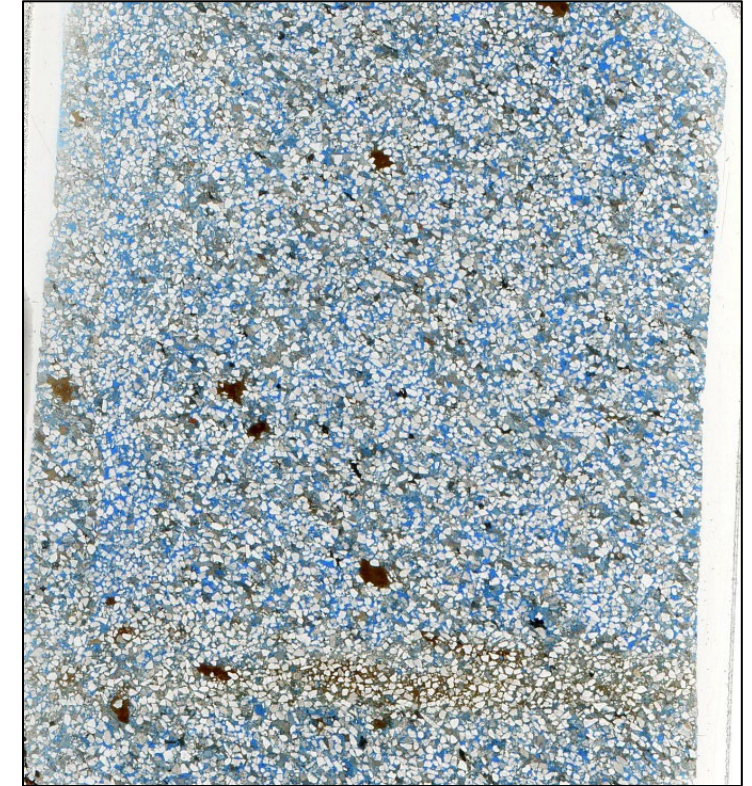
Current methods for extracting porosity volume:

- Labour intensive
- Potentially biased/non-representative

Strategic considerations

New method:

- Pass results of whole thin section scanner through image analysis software; automatically extract porosity value



Introduction – Whole thin section slide scanners

Glissando 20 SL WSI (whole slide imaging)



Images from
https://www.objectiveimaging.com/Glissando/Glissando_20SL.php

Specification

-  Multi-slide magazine. Up to 20 slides can be loaded at once
-  Auto-sample designation based on QR code reader
-  0.25µm per pixel resolution, with 0.75 aperture. Provides x20 magnification scan in 8 minutes



Images from
https://www.objectiveimaging.com/Glissando/Glissando_20SL.php

Techstack – total costs

1.



Gross = £45k
VAT = £9k (at 20%)

Total = £54k

2



Gross = £16k
VAT = £3.2k (at 20%)

Total = £19.2k

3



Gross = £2k
VAT = £400 (at 20%)

Total = £2.4k

Total cost of full techstack = £75.6k

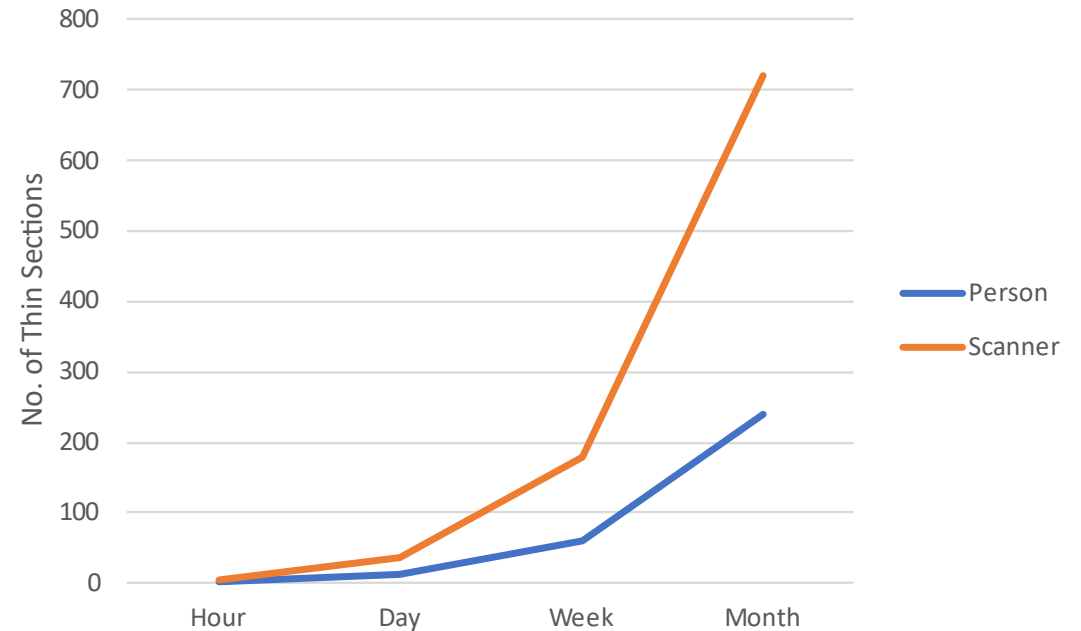
Sunk costs and present timings

- Sample scanned and porosity volume automatically extracted – new service
- Sample preparation costs and processing timing included in costing

Profit per slide:

T/S cost	Unit cost	multiplier	Total cost
consumable	£15.00	1	£15.00
Lab prep	£20.95	1.5	£31.43
Sample loading	Unit cost	division	Total cost
Lab time	£20.95	6	£3.49
Image processing	Unit cost	division	Total cost
Res. Geo time	£34.00	6	£5.67
Per Sample	total cost		£55.58
	Scanner turnover		£100.00
	Scanner profit		£44.42

Number of thin sections analysed per time period



	Hour	Day	Week	Month
Person	2	12	60	240
Scanner	6	36	180	720
<i>Difference</i>	4	24	120	480
Scanner Revenue	£266.50	£1,599.00	£7,995.00	£31,980.00

Option costs

Option A

T/S cost	Unit cost	multiplier	Total cost
consumable	£15.00	1	£15.00
Lab prep	£20.95	1.5	£31.43
Sample loading	Unit cost	division	Total cost
Lab time	£20.95	6	£3.49
Image processing	Unit cost	division	Total cost
Res. Geo time	£34.00	6	£5.67
Per Sample	total cost		£55.58
	Scanner turnover		£100.00
	Scanner profit		£44.42

samples per year	400
Scanner profit	£44.42
yearly profit	£17,766.67

Option B

T/S cost	Unit cost	multiplier	Total cost
consumable	£15.00	1	£15.00
Lab prep	£20.95	1.5	£31.43
Sample loading	Unit cost	division	Total cost
Lab time	£20.95	6	£3.49
Image processing	Unit cost	division	Total cost
Res. Geo time	£34.00	6	£5.67
Per Sample	total cost		£55.58
	Scanner turnover		£110.00
	Scanner profit		£54.42

samples per year	400
Scanner profit	£54.42
yearly profit	£21,766.67

Option C

T/S cost	Unit cost	multiplier	Total cost
consumable	£15.00	0	£0.00
Lab prep	£20.95	0	£0.00
Sample loading	Unit cost	division	Total cost
Lab time	£20.95	6	£3.49
Image processing	Unit cost	division	Total cost
Res. Geo time	£34.00	6	£5.67
Per Sample	total cost		£9.16
	Scanner turnover		£100.00
	Scanner profit		£90.84

samples per year	400
Scanner profit	£90.84
yearly profit	£36,336.67

Payback schedules

Payback period of initial investment



Average number of slides per year = 400

Option A

Option A

		Year				
Investment		1	2	3	4	5
Present Value	(75,600)	£17,766.67	£17,766.67	£17,766.67	£17,766.67	£17,766.67
Cumulative		£17,766.67	£35,533.33	£53,300.00	£71,066.67	£88,833.33

Profit = £44.42 per slide, with a £100 client charge

= Payback: 4 yrs, 3 mths

Option B

Option B

		Year				
Investment		1	2	3	4	5
Present Value	(75,600)	£21,766.67	£21,766.67	£21,766.67	£21,766.67	£21,766.67
Cumulative		£21,766.67	£43,533.33	£65,300.00	£87,066.67	£108,833.33

Profit = £54.42 per slide, with a £110 client charge

= Payback: 3 yrs, 5.7 mths

Lab processing costs removed

Option C

removed

Profit = £90.84 per slide, with a £100 client

Option C

		Year				
Investment		1	2	3	4	5
Present Value	(75,600)	£36,336.67	£36,336.67	£36,336.67	£36,336.67	£36,336.67
Cumulative		£36,336.67	£72,673.33	£109,010.00	£145,346.67	£181,683.33

Profit = £90.84 per slide, with a £100 client charge

= Payback: 2 yrs, 0.9 mths

NPV and IRR: comparison

Option A

Discount Rate (WACC)	10.00%					
		From Present Value Table				
Denominator	1.00	0.909	0.826	0.751	0.683	0.621
Investment		1	2	3	4	5
Future Value	(75,600)	16,151.52	14,683.20	13,348.36	12,134.87	11,031.70

NPV	(8,250)
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IRR (Excel Calculated)	5.63%
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This project is not commercially viable over a 5 year period

Option B

Discount Rate (WACC)	10.00%					
		From Present Value Table				
Denominator	1.00	0.909	0.826	0.751	0.683	0.621
Investment		1	2	3	4	5
Future Value	(75,600)	19,787.88	17,988.98	16,353.62	14,866.93	13,515.39

NPV	6,913
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IRR (Excel Calculated)	13.52%
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This project is commercially viable over a 5 year period

Option C

Discount Rate (WACC)	10.00%					
		From Present Value Table				
Denominator	1.00	0.909	0.826	0.751	0.683	0.621
Investment		1	2	3	4	5
Future Value	(75,600)	33,033.33	30,030.30	27,300.28	24,818.43	22,562.21

NPV	62,145
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IRR (Excel Calculated)	38.70%
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This project is commercially viable over a 5 year period. This project represents greatest rate of return

Conclusions

-  Utilising scanning technology increases analytical efficiency. More samples are processed in the same time period and results are more repeatable
-  When lab preparation costs are included within the cost of analysing each sample:
 - Payback period is over 3 years
 - IRR is relatively low at 13% (option B - £110 per sample charge to clients)
-  When lab preparation costs are removed from the cost of analysing each sample:
 - Payback period is over ~2 years
 - IRR is high at ~39%. This IRR is achieved at a client price of £100 per sample, which is equivalent to rates today

Strategic considerations

-  Client expectation is that we include scanning technology within our workflows
-  Competitor analysis indicates use of scanner technology in their workflows and products
-  **This technology will also allow us to generate additional products. Correct to invest from a strategic viewpoint.**