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Business Analysis

GenericPaintingCompany is a sole trader run business based in Ferryside, providing exterior and interior painting and decorating services to Carmarthenshire. It is a newly established company; therefore, it does not have presence in the marketplace or an established customer base. GenericPaintingCompany has access to the following resources:

- Work van
- Car
- Carpentry tools
- Painting tools
- Online advertising

By using existing tools and equipment, there is minimal investment in new equipment. The largest recurring cost is the maintenance and insurance of the car and van which equates to roughly £3000 a year.

The local competition for painting and decorating is minimal; however, there is another sole trader based in Ferryside, which causes high competition for contracts in the village. The main areas of operation are centred around Carmarthen, providing service to the town and surrounding villages.

Microeconomic Factors

Price of consumables

Currently the price of emulsion paint in the Carmarthenshire area is around £20 for 2.5L (B&Q, 2024 & Dunelm.com, 2025). This will affect the overall cost of the service a painter decorator provides, potentially increasing or decreasing how willing customers are to pay for the service. It is important to consider how much disposable income a household will have; Carmarthenshire does not have as much net income after housing as Swansea and Cardiff do (Figure 1), so it is important not to compare service pricing with traders operating in those areas (Office for National Statistics, 2023).

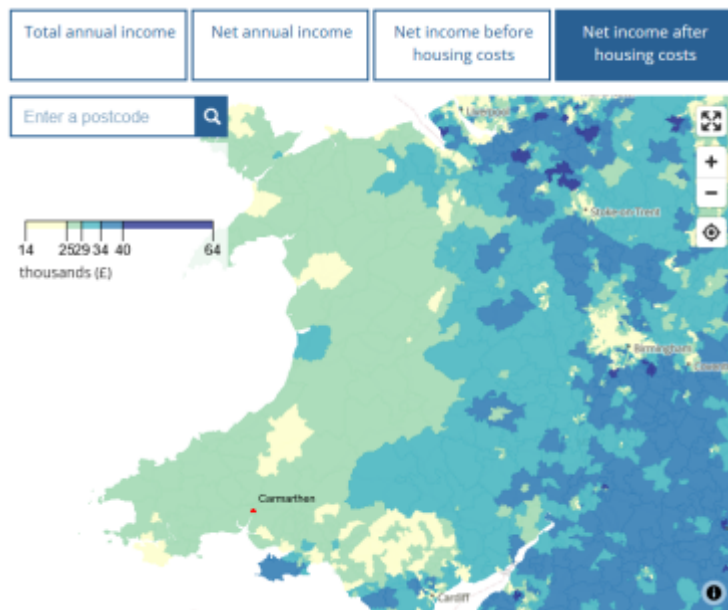


Figure 1 - Map of Wales' income (adapted from Office for National Statistics, 2023)

Competition

There are around 25 painters/ decorators advertising their services online in the Carmarthenshire area (Checkatrade.com, 2018 & Mybuilder.com, 2024 & Yell, 2019). Assuming 60% of small businesses use digital marketing (Krivec, R. 2023), the estimated total number is 40 painters/ decorators in Carmarthenshire. The other painter/ decorator operating in Ferryside does not actively advertise online; therefore, the best method of gaining an advantage would be to actively advertise services in local online groups.

Availability of work

The population of Carmarthenshire is approximately 187,900 (www.ons.gov.uk, 2021) within 73,100 households (Members' Research Service / Gwasanaeth Ymchwil yr Aelodau, 2008). Assuming the exterior of a house is repainted every 5 to 10 years (PaintRite Pros, 2020), in the worst case scenario, 7310 houses in Carmarthen should be repainted each year. The interior of a house should be repainted every 3 to 5 years (PrecisionPaintingPlus, 2022); this leaves 14,620 interiors to be painted every year. With an estimated 65% (Houzz, 2017) of homeowners doing their own interior painting this leaves 3655 houses left. Divided among 40 painters/ decorators, there is an excess of work.

Transportation

"Carmarthenshire has one of the lower quartile rates of spend per kilometre on highways and roads for Wales." (Carmarthenshire County Council, 2020). Considering this and that Carmarthenshire has the third highest level of traffic in Wales (Carmarthenshire County Council, 2022), maintenance costs on vehicles may be higher than the average until the council's schemes are complete. Travelling between villages on rural roads will also contribute to such costs.

Macroeconomic Factors

Government funding of new housing

The Welsh government is aiming to construct 20,000 new houses by 2026 (Cih.org, 2024), providing additional indoor work and further opportunities in the future.

Government regulations around volatile organic compounds

Governments around the world are reducing the maximum amount of volatile organic compounds allowed in paint (House Painting Blog, 2025 & Department for Environment, Food and Rural Affairs, 2015). This has caused the industry to innovate the materials used in paint. This may increase the cost of paint and require painters to purchase additional personal protective equipment to comply with new standards (Hyde Tools, 2024).

Prices of raw materials used in paint

The prices of raw materials used to manufacture paint are forecasted to increase by 8% (BCIS, 2024), which may require contractors to absorb the additional material costs if they want to maintain their customer base.

Expenditure on the Home

While the overall spending on homes has decreased due to the economic downturn, households are realising the value of maintaining their homes through painting and decorating (Business Gateway, 2024). This may offset the rising costs of materials due to an increased demand for the service.

SWOT Analysis

Strengths - Excess work - Limited competition - Located near a large population - IT literacy for marketing	Weaknesses - Limited experience - Limited tools - Not established in the community - Sole trader
Opportunities - Reduce material cost using trade account discounts - Establish a repeating customer base - Focus on active online marketing - Passive marketing through decals on vehicles	Threats - Poor weather conditions - Rising material costs - Introduction of stricter regulations - Economic climate

PEST Analysis of Macroeconomic Factors

Political - Health and safety regulations - Environmental regulations - Government spending on housing - Regulations and procedures for reporting income	Economical - Value of the GBP - Changes in renting vs owning properties - Average income affecting willingness to spend money
Social - Public's preference for hiring large painting firms over sole traders - How a community values their houses' appearance - The rising trend of fixing over replacing	Technological - Opportunities in digital marketing - Online reviews - Research competition - Insight into potential threats

The main strengths of GenericPaintingCompany relate to the location it operates in. With an excess of painting work; regular advertisement on platforms such as Facebook will provide enquiries from customers; over time, satisfied customers may provide repeat business. To advertise to people who do not use those platforms; decals will be applied to company vehicles, this will passively advertise the company while commuting to and from work. With the high-traffic roads, this will lead to further enquiries.

The location also provides threats against the company. The poor road conditions and salty atmosphere may require that only the work van is used, so as to reduce the overhead costs of maintaining the vehicles. Since Carmarthenshire is located on the coast, the weather in the winter is wet, reducing work to the indoors and increasing the competition for contracts.

Project Management

An analysis of an example project is conducted using the data in Table 1.

Task Label	Duration (days)	Predecessor Tasks	Persons Required
A	4	-	1
B	5	-	2
C	7	-	1
D	3	-	2
E	3	A	2
F	5	A	2
G	4	E	1
H	3	F	3
I	5	F	2
J	2	B, F	4
K	5	G, H	3
L	7	I, J	3
M	6	D	2
N	4	C, L	4
O	3	I, J	2
P	4	M	2
Q	3	K, N, O	3
R	2	P, Q	4

Table 1 - Project Breakdown

To visualise the order in which the tasks of the project need to be completed, a network diagram is constructed in the activity on arrow (AoA) format (Figure 2).

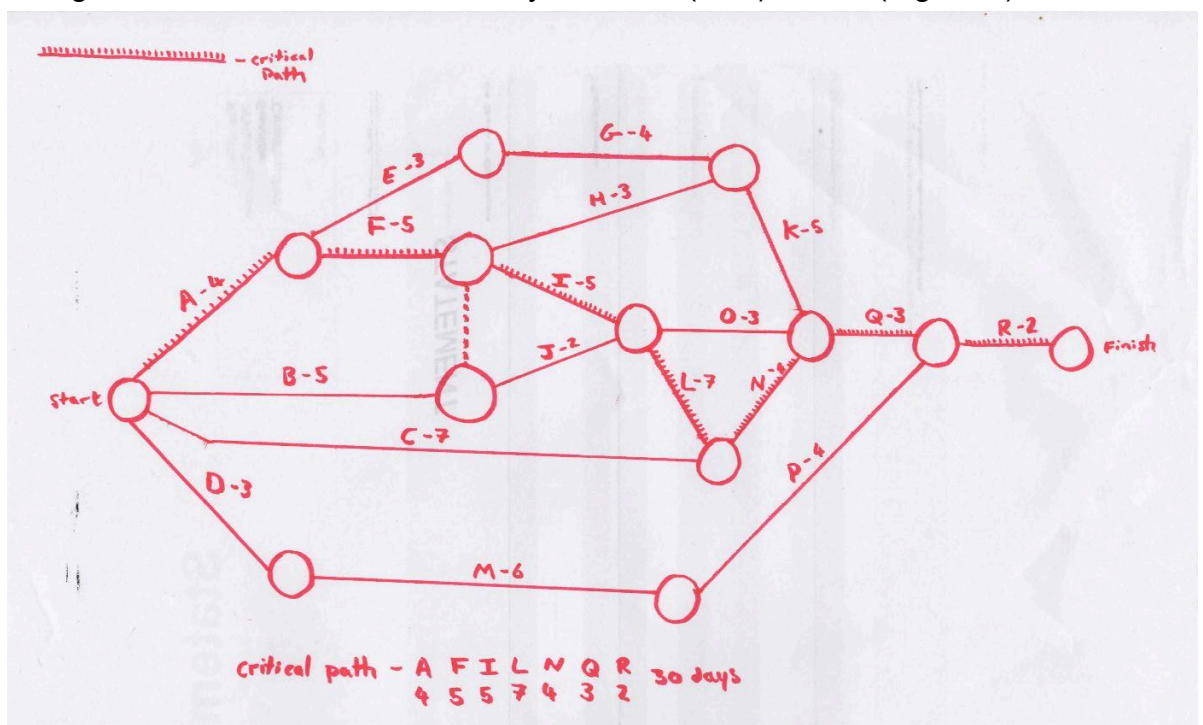


Figure 2 - Hand Drawn AoA Diagram

To further examine the timeline of the project, the earliest and latest start and finish time for each task is tabulated in Table 2.

Assuming work starts at the beginning of day 1:

Task Label	Earliest Start Time (EST)	Earliest Finish Time (EFT)	Latest Start Time (LST)	Latest Finish Time (LFT)	Slack (days)
A	Day 1	Day 4	Day 1	Day 4	0
B	Day 1	Day 5	Day 5	Day 9	4
C	Day 1	Day 7	Day 15	Day 21	14
D	Day 1	Day 3	Day 16	Day 18	15
E	Day 5	Day 7	Day 14	Day 16	9
F	Day 5	Day 9	Day 5	Day 9	0
G	Day 8	Day 11	Day 17	Day 20	9
H	Day 10	Day 12	Day 18	Day 20	8
I	Day 10	Day 14	Day 10	Day 14	0
J	Day 10	Day 11	Day 13	Day 14	3
K	Day 13	Day 17	Day 21	Day 25	8
L	Day 15	Day 21	Day 15	Day 21	0
M	Day 4	Day 9	Day 19	Day 24	15
N	Day 22	Day 25	Day 22	Day 25	0
O	Day 15	Day 17	Day 23	Day 25	8
P	Day 10	Day 13	Day 25	Day 28	15
Q	Day 26	Day 28	Day 26	Day 28	0
R	Day 29	Day 30	Day 29	Day 30	0

Table 2 - EST, EFT, LST and LFT Table

Modelling Using Microsoft Project

To easily analyse the project, Microsoft Project is used. Table 1 is entered into Microsoft Project (Table 3), where the start and finish times including non-working days and the critical path are automatically calculated (Figure 3).

	Task Mode	Task Name	Duration	Start	Finish	Predecessors	Critical	people required	R
1		A	4 days	Thu 13/02/25	Tue 18/02/25			Yes 1	
2		B	5 days	Thu 13/02/25	Wed 19/02/25			No 2	
3		C	7 days	Thu 13/02/25	Fri 21/02/25			No 1	
4		D	3 days	Thu 13/02/25	Mon 17/02/25			No 2	
5		E	3 days	Wed 19/02/25	Fri 21/02/25	1		No 2	
6		F	5 days	Wed 19/02/25	Tue 25/02/25	1		Yes 2	
7		G	4 days	Mon 24/02/25	Thu 27/02/25	5		No 1	
8		H	3 days	Wed 26/02/25	Fri 28/02/25	6		No 3	
9		I	5 days	Wed 26/02/25	Tue 04/03/25	6		Yes 2	
10		J	2 days	Wed 26/02/25	Thu 27/02/25	2,6		No 4	
11		K	5 days	Mon 03/03/25	Fri 07/03/25	7,8		No 3	
12		L	7 days	Wed 05/03/25	Thu 13/03/25	9,10		Yes 3	
13		M	6 days	Tue 18/02/25	Tue 25/02/25	4		No 2	
14		N	4 days	Fri 14/03/25	Wed 19/03/25	3,12		Yes 4	
15		O	3 days	Wed 05/03/25	Fri 07/03/25	9,10		No 2	
16		P	4 days	Wed 26/02/25	Mon 03/03/25	13		No 2	
17		Q	3 days	Thu 20/03/25	Mon 24/03/25	11,14,15		Yes 3	
18		R	2 days	Tue 25/03/25	Wed 26/03/25	16,17		Yes 4	

Table 3 - Digital Project Table in Microsoft Project

Project Statistics for 'Project0.9'			
	Start		Finish
Current	Thu 13/02/25		Wed 26/03/25
Baseline	NA		NA
Actual	NA		NA
Variance	0d		0d
	Duration	Work	Cost
Current	30d	0h	£0.00
Baseline	0d	0h	£0.00
Actual	0d	0h	£0.00
Remaining	30d	0h	£0.00
Percent complete:			
Duration: 0% Work: 0%			
Close			

Figure 3 - Project Statistics Generated by Microsoft Project

Using this information, a Gantt chart showing the critical path and slack is generated (Figure 4).

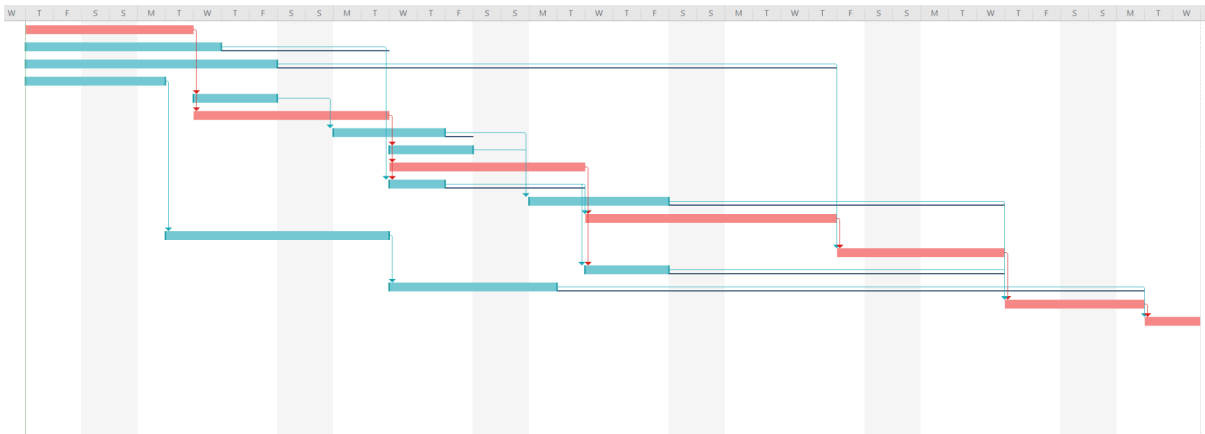


Figure 4 - Gantt Chart Generated by Microsoft Project

To further help with task visualisation, a flow diagram is also created (Figure 5).

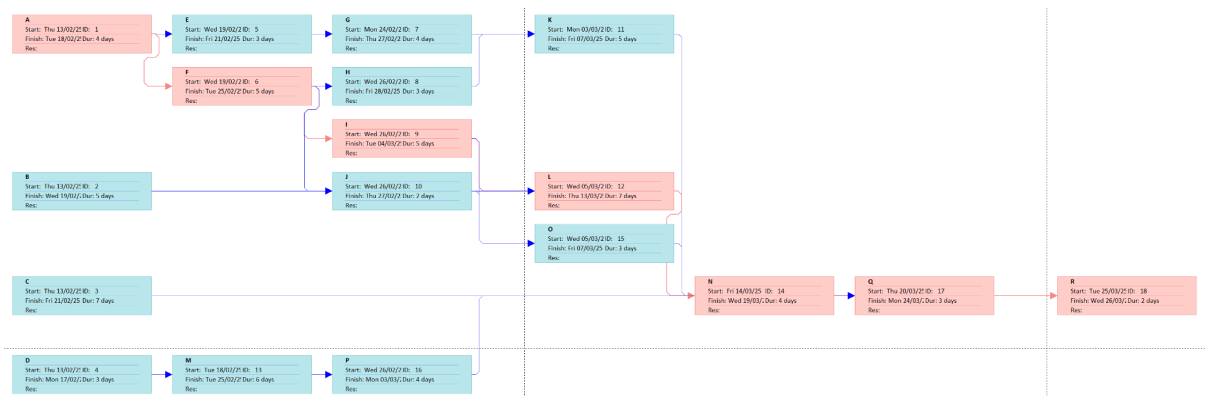


Figure 5 - Flow Diagram Generated by Microsoft Project

The resources for the critical path are assigned in order to determine the minimum number of resources required (Figure 6).

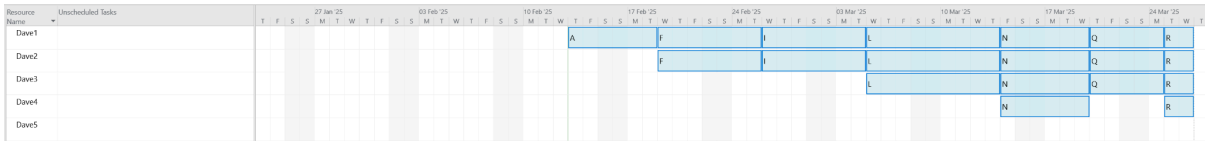


Figure 6 - Resources for the Critical Path Inputted into Microsoft Project

Refining the Project

Using the resource planner, tasks are reorganised and more people are added, until the minimum number of people required to complete the tasks is found (Figure 7).

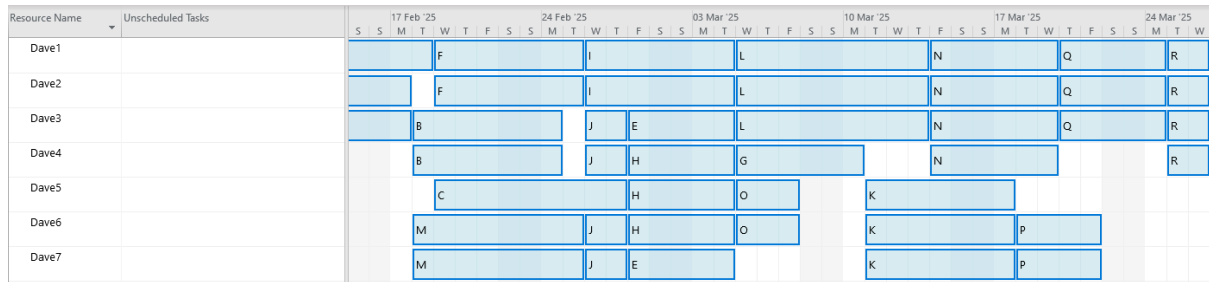


Figure 7 - Refined Resource Distribution Inputted into Microsoft Project

This organisation requires seven people to complete the project within 30 working days. The gantt chart and table are updated to reflect the changes in the timings of tasks (Figure 8; Table 4).

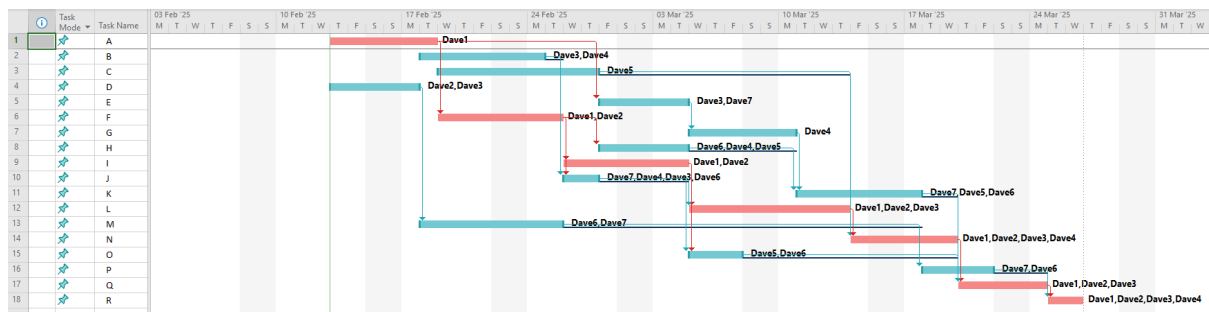


Figure 8 - Refined Gantt Chart Generated by Microsoft Project

Task Mode	Task Name	Duration	Start	Finish	Predecessors	Critical	people required	Resource Names	Early Start	Early Finish	Late Start	Late Finish	Finish Slack	Start Slack
1	A	4 days	Thu 13/02/25	Tue 18/02/25			Yes 1	Dave1	Thu 13/02/25	Tue 18/02/25	Thu 13/02/25	Wed 19/02/25	0 days	0 days
2	B	5 days	Tue 18/02/25	Mon 24/02/25			No 2	Dave3, Dave4	Tue 18/02/25	Mon 24/02/25	Mon 24/02/25	Mon 03/03/25	4 days	4 days
3	C	7 days	Wed 19/02/25	Thu 27/02/25			No 1	Dave5	Wed 19/02/25	Thu 27/02/25	Wed 05/03/25	Fri 14/03/25	10 days	10 days
4	D	3 days	Thu 13/02/25	Mon 17/02/25			No 2	Dave2, Dave3	Thu 13/02/25	Mon 17/02/25	Thu 06/03/25	Tue 11/03/25	15 days	15 days
5	E	3 days	Fri 28/02/25	Tue 04/03/25			No 2	Dave3, Dave7	Fri 28/02/25	Tue 04/03/25	Tue 04/03/25	Fri 07/03/25	2 days	2 days
6	F	5 days	Wed 19/02/25	Tue 25/02/25			Yes 2	Dave1, Dave2	Wed 19/02/25	Tue 25/02/25	Wed 19/02/25	Wed 26/02/25	0 days	0 days
7	G	4 days	Wed 05/03/25	Mon 10/03/25			No 1	Dave4	Wed 05/03/25	Mon 10/03/25	Fri 07/03/25	Thu 13/03/25	2 days	2 days
8	H	3 days	Fri 28/02/25	Tue 04/03/25			No 3	Dave6, Dave4, Dave5	Fri 28/02/25	Tue 04/03/25	Mon 10/03/25	Thu 13/03/25	6 days	6 days
9	I	5 days	Wed 26/02/25	Tue 04/03/25			Yes 2	Dave1, Dave2	Wed 26/02/25	Tue 04/03/25	Wed 26/02/25	Wed 05/03/25	0 days	0 days
10	J	2 days	Wed 26/02/25	Thu 27/02/25			No 4	Dave7, Dave4, Dave3, Dave5	Wed 26/02/25	Thu 27/02/25	Mon 03/03/25	Wed 05/03/25	3 days	3 days
11	K	5 days	Tue 11/03/25	Mon 17/03/25			No 3	Dave7, Dave5, Dave6	Tue 11/03/25	Mon 17/03/25	Thu 13/03/25	Thu 20/03/25	2 days	2 days
12	L	7 days	Wed 05/03/25	Thu 13/03/25			Yes 3	Dave1, Dave2, Dave3	Wed 05/03/25	Thu 13/03/25	Wed 05/03/25	Fri 14/03/25	0 days	0 days
13	M	6 days	Tue 18/02/25	Tue 25/02/25			No 2	Dave6, Dave7	Tue 18/02/25	Tue 25/02/25	Tue 11/03/25	Wed 19/03/25	15 days	15 days
14	N	4 days	Fri 14/03/25	Wed 19/03/25			Yes 4	Dave1, Dave2, Dave3, Dave5	Fri 14/03/25	Wed 19/03/25	Fri 14/03/25	Thu 20/03/25	0 days	0 days
15	O	3 days	Wed 05/03/25	Fri 07/03/25			No 2	Dave5, Dave6	Wed 05/03/25	Fri 07/03/25	Mon 17/03/25	Thu 20/03/25	8 days	8 days
16	P	4 days	Tue 18/03/25	Fri 21/03/25			No 2	Dave7, Dave1	Tue 18/03/25	Fri 21/03/25	Wed 19/03/25	Tue 25/03/25	1 day	1 day
17	Q	3 days	Thu 20/03/25	Mon 24/03/25			Yes 3	Dave1, Dave2, Dave3	Thu 20/03/25	Mon 24/03/25	Thu 20/03/25	Tue 25/03/25	0 days	0 days
18	R	2 days	Tue 25/03/25	Wed 26/03/25			Yes 4	Dave1, Dave2, Dave3, Dave5	Tue 25/03/25	Wed 26/03/25	Tue 25/03/25	Wed 26/03/25	0 days	0 days

Table 4 - Refined Gantt Table Generated by Microsoft Project

There is still enough slack so that tasks can be delayed slightly if staff falls ill and a day or two of work is missed. The total working hours is shown in Figure 9.

Project Statistics for 'Project0.9'			
	Start		Finish
Current	Thu 13/02/25		Wed 26/03/25
Baseline	NA		NA
Actual	NA		NA
Variance	0d		0d
	Duration	Work	Cost
Current	30d	1,352h	£0.00
Baseline	0d	0h	£0.00
Actual	0d	0h	£0.00
Remaining	30d	1,352h	£0.00
Percent complete:			
Duration: 0%		Work: 0%	
			Close

Figure 9 - Refined Projects' Statistics Generated by Microsoft Project

The final flow diagram of the project is created with the finalised dates (Figure 10).

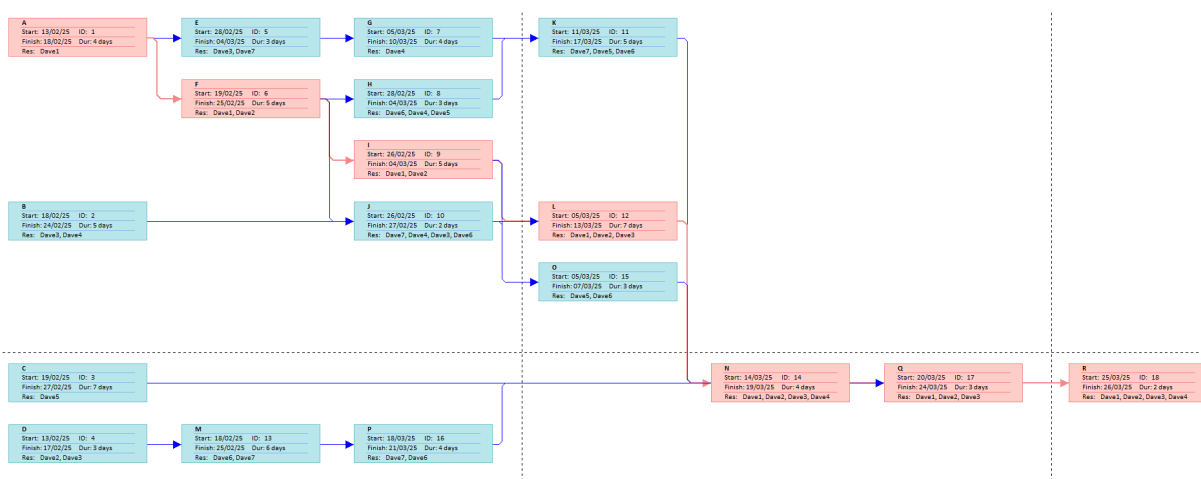


Figure 10 - Final Flow Diagram Generated by Microsoft Project

Financial Depreciation

Financial depreciation is a method to track the reduction of a tangible asset's value over time (Contractor Advice uk, 2019). When an asset is purchased, a capitalisation policy is conducted, which determines the value and expected life span of the asset. This data is used to decide which method of depreciation is used to better reflect the reduction in the assets' value per year (Ainsworth Accountants).

Straight Line Depreciation

Used for shorter lifespan assets, this method reduces an asset's value by a fixed amount each year (Figure 11, orange line). The yearly depreciation can be calculated by dividing the asset's original value, minus scrap value, by its life span (IONOS, 2023).

Accelerated Depreciation

If an asset loses a large amount of value in the first few years of its life, accelerated depreciation is used (Figure 11, blue line). The basic method is to take a fixed percentage off the asset's book (previous year's) value. If greater depreciation is necessary, the rate of depreciation can be doubled to produce a steeper decline in the assets value (Boxwell, A, 2024).

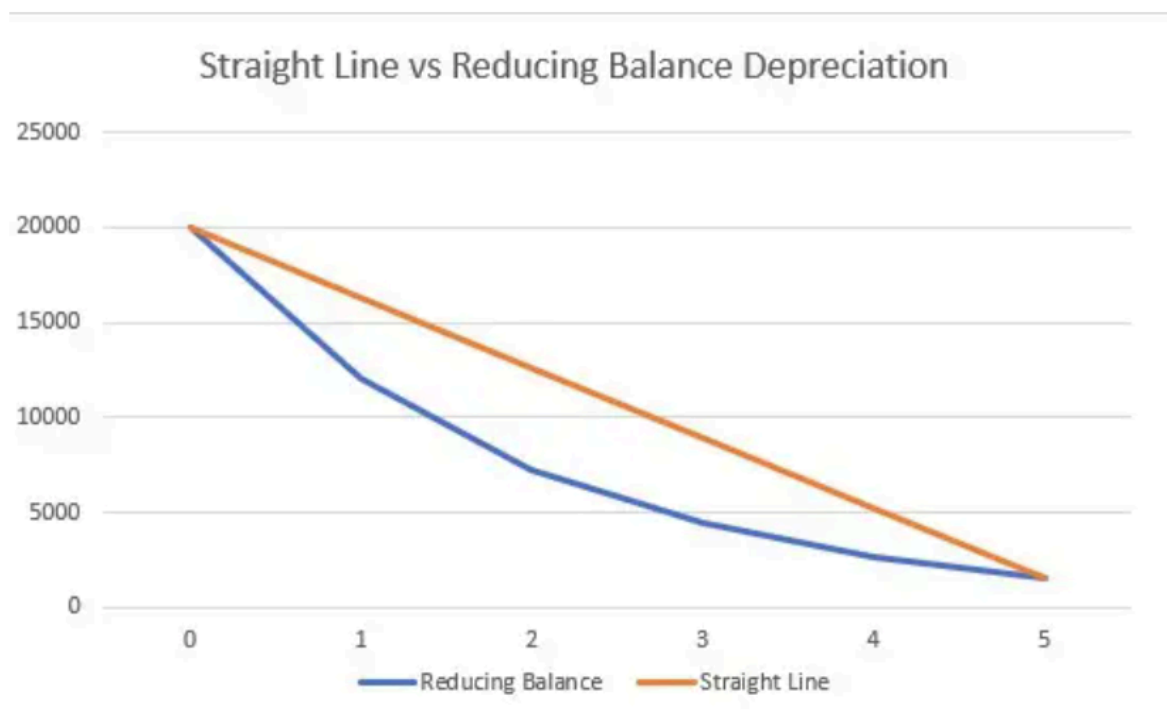


Figure 11 - Straight Line vs Accelerated (Reducing Balance) Depreciation (Boxwell, A, 2024)

Example

Production machinery and delivery vehicles are currently valued at £190,000. A straight line depreciation of 19% per annum or an accelerated depreciation of 23% are available.

Machinery decreases in value significantly once it is used; however, machines have a long enough life span that the value plateaus at a low value but continues to be used (Erumban, A A, 2008, pg 252). Therefore, the best method of calculating machinery depreciation is through accelerated depreciation. The depreciation is calculated over three years (Table 5; Figure 12).

Accelerated depreciation			
Year	#	Residual Value	Depreciation
0		190,000.00	43,700.00
1		146,300.00	33,649.00
2		112,651.00	25,909.73
3		86,741.27	11,276.37

Table 5 - Accelerated Depreciation Table

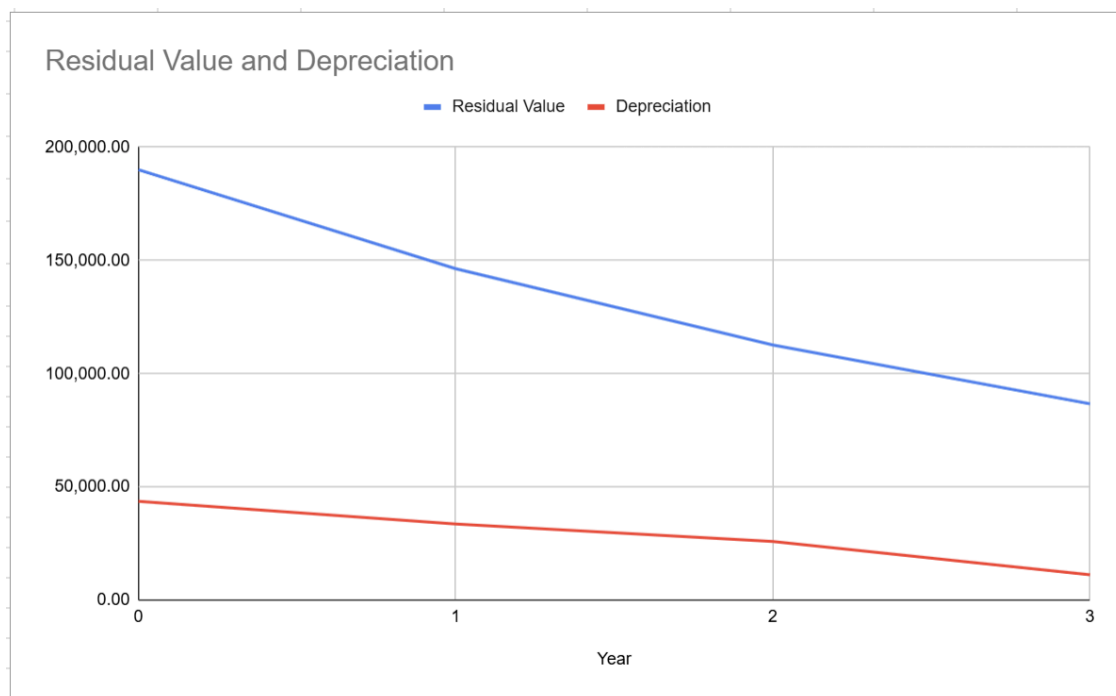


Figure 12 - Accelerated Depreciation Residual Value

Vehicles generally have a shorter life span than machinery. The value of vehicles decreases steadily as it is used until it needs to be scrapped. Therefore, a straight line depreciation should be considered (Table 6; Figure 13).

Linear Depreciation ▾			
Year ▾	#	Residual Value ▾	Depreciation ▾
0		190,000.00	36,100.00
1		153,900.00	36,100.00
2		117,800.00	36,100.00
3		81,700.00	36,100.00

Table 6 - Straight Line Depreciation Table

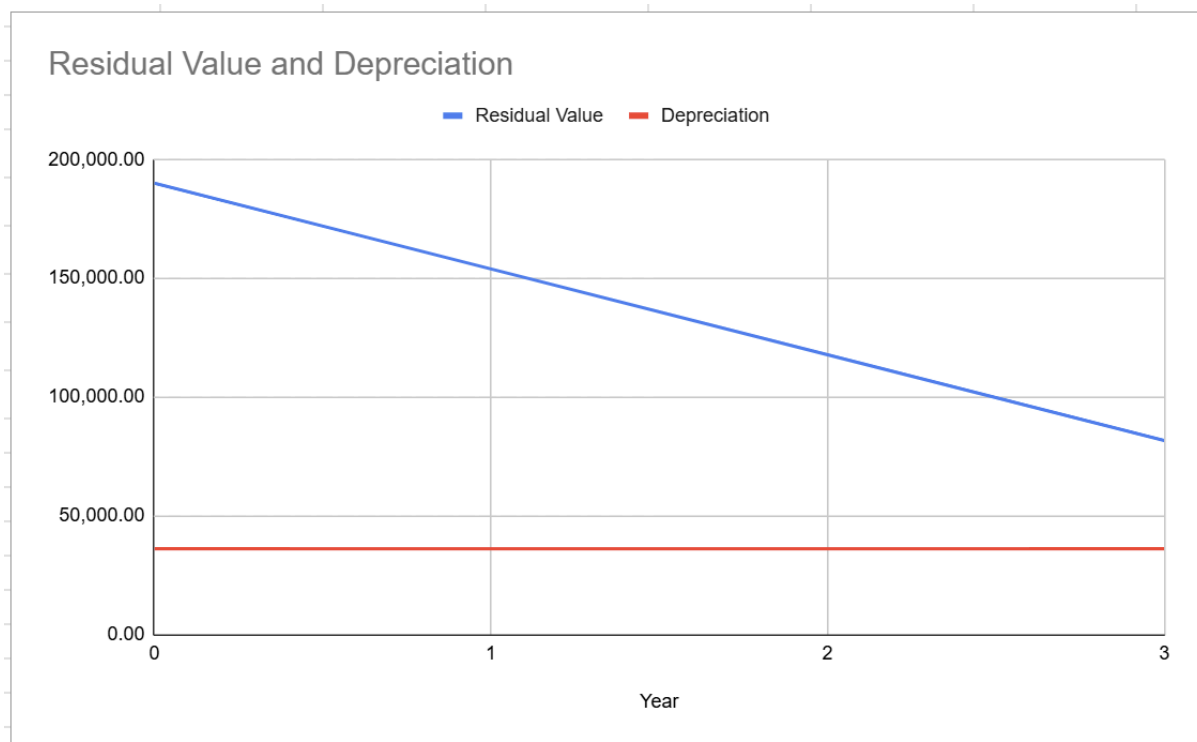


Figure 13 - Straight Line Residual Value

Production Comparison

Cost of production		
	Company A	Company B
Sales Revenue	£3,000,000	£3,000,000
Less cost of sales		
Plant depreciation	£700,000	£450,000
Production labour	£650,000	£850,000
Materials	£650,000	£700,000
Gross Profit	£1,000,000	£1,000,000

Table 7 - Cost of Production for Companies A and B

As shown in Table 7, company B relies mainly on labour to produce their products, which causes inefficiency in material consumption but decreases the depreciation of plant assets; company A mainly uses automated processes, which reduces the labour cost and increases the efficiency of material consumption but increases the depreciation of plant assets.

Using human labour may be cheaper in the short term; however, investing in automated machinery will be beneficial for long term profitability. A company which is actively implementing automation will see an increase in efficiency and productivity. This can be seen in company A, where the production cost is £250,000 less than company B's. The original investment in automation causes a high depreciation of the plant's value, but due to the lifespan of the machinery, the depreciation per annum will decrease without affecting the production.

If company A has a plan for managing and maintaining the machinery, their company will, most likely, be better for long term investment. Over time, their production and profits will increase with sufficient investment in further automating production, and the company's finances will be more stable than company B's.

Analysis of Profit/ Loss

The machine shop has been asked to provide ball valves at the rate of 10,000 per annum to a major automotive supplier at a fixed price of £145/unit. You have been asked to include a decision to manufacture internally or outsource based on the following:

Table 2

Annual cost information	
Marginal costs:	
Direct labour	£355 000
Direct materials	£760 000
Variable overheads (power)	£52 000
Fixed overheads:	
Rent/rates	£88 000
Administration	£75 000

Alternatively, you can outsource the valves to an overseas supplier for £135/set. Include the following information in your report to support your decision:

Table 8 - Example Annual Cost Table

Using values from Table 8, the price per unit if the ball valves are manufactured in house is calculated by dividing the price of labour, materials and power by the amount of units it creates.

$\text{£}355,000 / 10,000 = \text{£}35.5 / \text{unit in labour}$

$\text{£}760,000 / 10,000 = \text{£}76 / \text{unit in materials}$

$\text{£}52,000 / 10,000 = \text{£}5.2 / \text{unit in power}$

Total = £116.7/ unit

This does not account for the fixed overheads that will need to be paid no matter how many units are manufactured. Table 9 calculates the profit for a step of 500 units manufactured, allowing the breakeven point to be plotted (Figure 14).

Units	Total Revenue	Total Fixed Costs	Unit Price	Unit Cost	Total Variable Cost	Total Cost	Profit	Break Even
0	0	163000	145	116.7	0	163000	-163000	5760
500	72500	163000	145	116.7	58350	221350	-148850	5760
1000	145000	163000	145	116.7	116700	279700	-134700	5760
1500	217500	163000	145	116.7	175050	338050	-120550	5760
2000	290000	163000	145	116.7	233400	396400	-106400	5760
2500	362500	163000	145	116.7	291750	454750	-92250	5760
3000	435000	163000	145	116.7	350100	513100	-78100	5760
3500	507500	163000	145	116.7	408450	571450	-63950	5760
4000	580000	163000	145	116.7	466800	629800	-49800	5760
4500	652500	163000	145	116.7	525150	688150	-35650	5760
5000	725000	163000	145	116.7	583500	746500	-21500	5760
5500	797500	163000	145	116.7	641850	804850	-7350	5760
6000	870000	163000	145	116.7	700200	863200	6800	5760
6500	942500	163000	145	116.7	758550	921550	20950	5760
7000	1015000	163000	145	116.7	816900	979900	35100	5760
7500	1087500	163000	145	116.7	875250	1038250	49250	5760
8000	1160000	163000	145	116.7	933600	1096600	63400	5760
8500	1232500	163000	145	116.7	991950	1154950	77550	5760
9000	1305000	163000	145	116.7	1050300	1213300	91700	5760
9500	1377500	163000	145	116.7	1108650	1271650	105850	5760
10000	1450000	163000	145	116.7	1167000	1330000	120000	5760

Table 9 - Profit/ Loss Table for In House Manufacturing

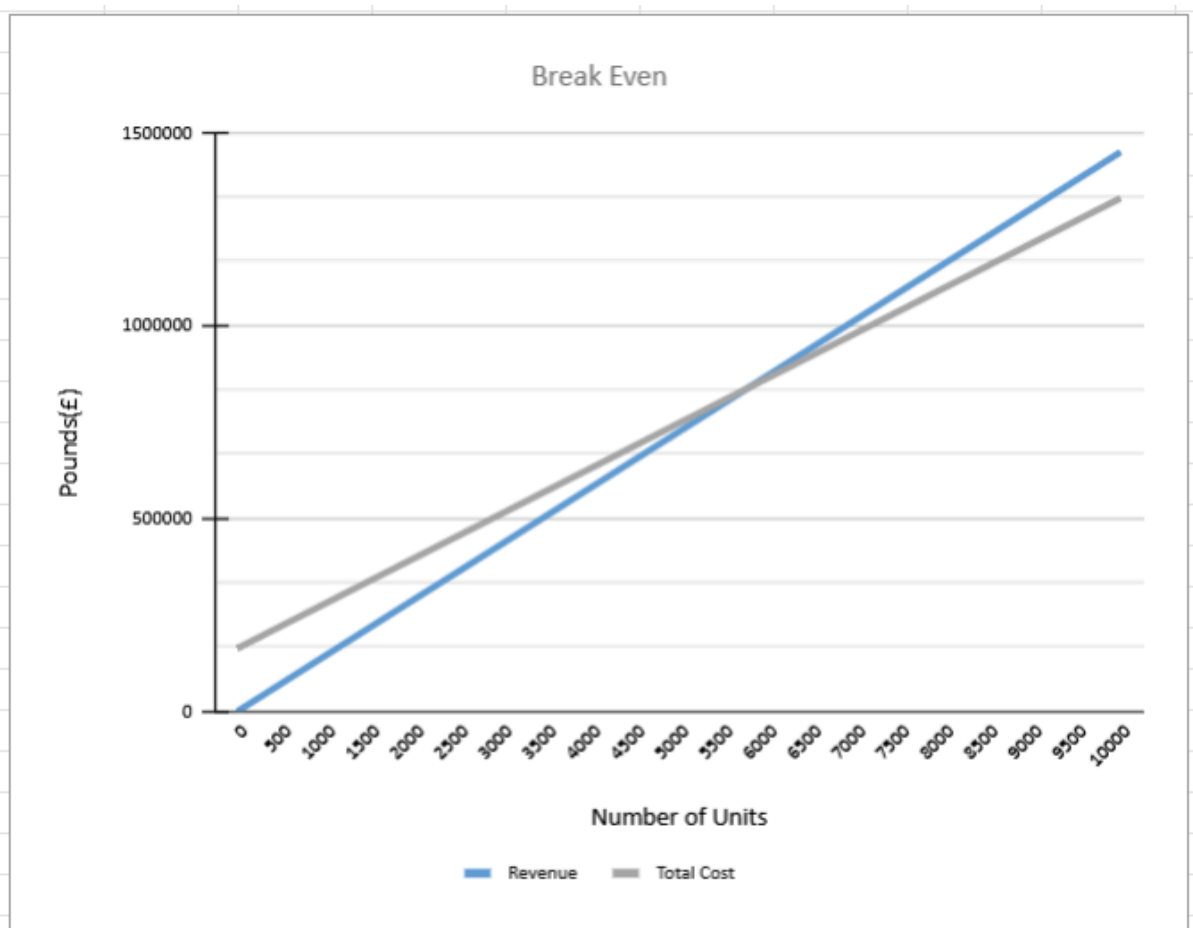


Figure 14 - Breakeven Graph for In House Manufacturing

The contribution margin is calculated to determine how much of a unit's sale price is going towards its manufacture. The contribution sales calculations are compared to the calculations in Table 9 to check their accuracy (Figure 15).

Contribution Ratio									
Unit Price	145								
Unit Variable Cost	116.7								
Contribution Ratio =	<u>Unit Price - Unit Variable Cost</u>		=	19.5%					
	Unit Price								
Contribution Sales	=	No of Units x Unit Price x Contribution Ratio - Fixed Costs							
Volumes									
5000		-21500							
7000		35100							
9000		91700							
5759.72		0.076							

Figure 15 - Contribution Ratio for In House Manufacturing

Assuming that the production costs, sale prices and quantity are the same over the next five years, the profit difference between in house and outsourcing can be calculated and examined. A new breakeven chart is constructed for outsourcing the ball valves (Table 10).

Units	Total Revenue	Total Fixed Costs	Unit Price	Unit Cost	Total Variable Cost	Total Cost	Profit	Break Even
0	0	0	145	135	0	0	0	0
500	72500	0	145	135	67500	67500	5000	0
1000	145000	0	145	135	135000	135000	10000	0
1500	217500	0	145	135	202500	202500	15000	0
2000	290000	0	145	135	270000	270000	20000	0
2500	362500	0	145	135	337500	337500	25000	0
3000	435000	0	145	135	405000	405000	30000	0
3500	507500	0	145	135	472500	472500	35000	0
4000	580000	0	145	135	540000	540000	40000	0
4500	652500	0	145	135	607500	607500	45000	0
5000	725000	0	145	135	675000	675000	50000	0
5500	797500	0	145	135	742500	742500	55000	0
6000	870000	0	145	135	810000	810000	60000	0
6500	942500	0	145	135	877500	877500	65000	0
7000	1015000	0	145	135	945000	945000	70000	0
7500	1087500	0	145	135	1012500	1012500	75000	0
8000	1160000	0	145	135	1080000	1080000	80000	0
8500	1232500	0	145	135	1147500	1147500	85000	0
9000	1305000	0	145	135	1215000	1215000	90000	0
9500	1377500	0	145	135	1282500	1282500	95000	0
10000	1450000	0	145	135	1350000	1350000	100000	0

Table 10 - Profit/ Loss Table for Outsourcing, Assuming Zero Fixed Overheads

Figure 16 compares the margins, over a year, for both methods.

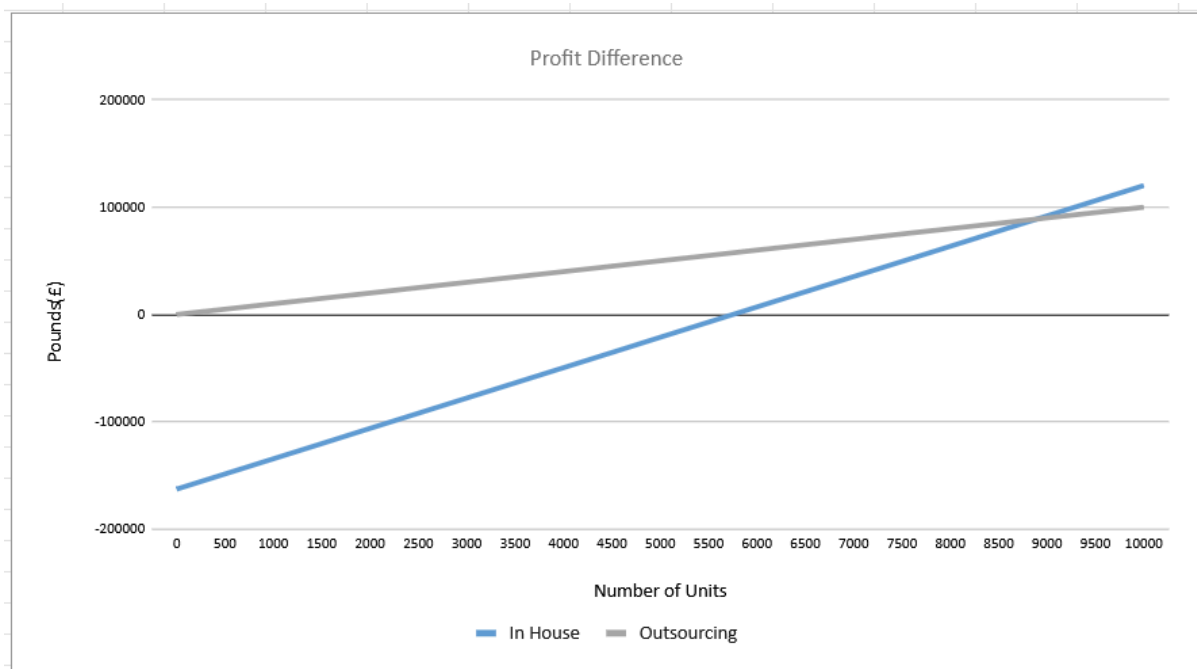


Figure 16 - Graph of Profit Difference Between Outsourcing and In House Manufacturing

Per year, in house manufacture creates a profit of £120,000, whereas outsourcing has a profit of £100,000. Over five years, this rises to £600,000 and £500,000, respectively. If this contract is the company's main source of income and the contract will last a long period of time, it will be beneficial to manufacture the parts in house. This will provide opportunities to improve the efficiency of manufacturing the parts, through dedicated jigs and machinery. Over time, the number of units manufactured could be increased, which could lead to further profits.

If the contract is not the company's main source of revenue, and its length is short, it may be better to outsource manufacturing. This will free up space in the workshop for other products' manufacture, and allow the company to seek a longer lasting contract that suits the machinery they have, while continuing to turn profit.

Outsourcing the manufacture presents risks that the company needs to manage. The parts produced need to be of high quality, which would be controlled in house; however, when manufactured elsewhere it cannot be supervised as much. Therefore, it will be important to select a manufacturer who has a reputation for high quality. Communication about product quantity with the sub contractor will also be important to avoid the bullwhip effect, where each supplier in the supply chain buys excess material to account for defects, which results in excess consumption of materials. Transportation between the sub contractor and client will also need to be arranged. It is critical that the transportation times and routes are calculated. Selection of a trusted supplier will also protect the design of the ball valves from being stolen and reproduced.

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Appendix A - Figures

Figure 1 - Map of Wales' income (adapted from Office for National Statistics, 2023)

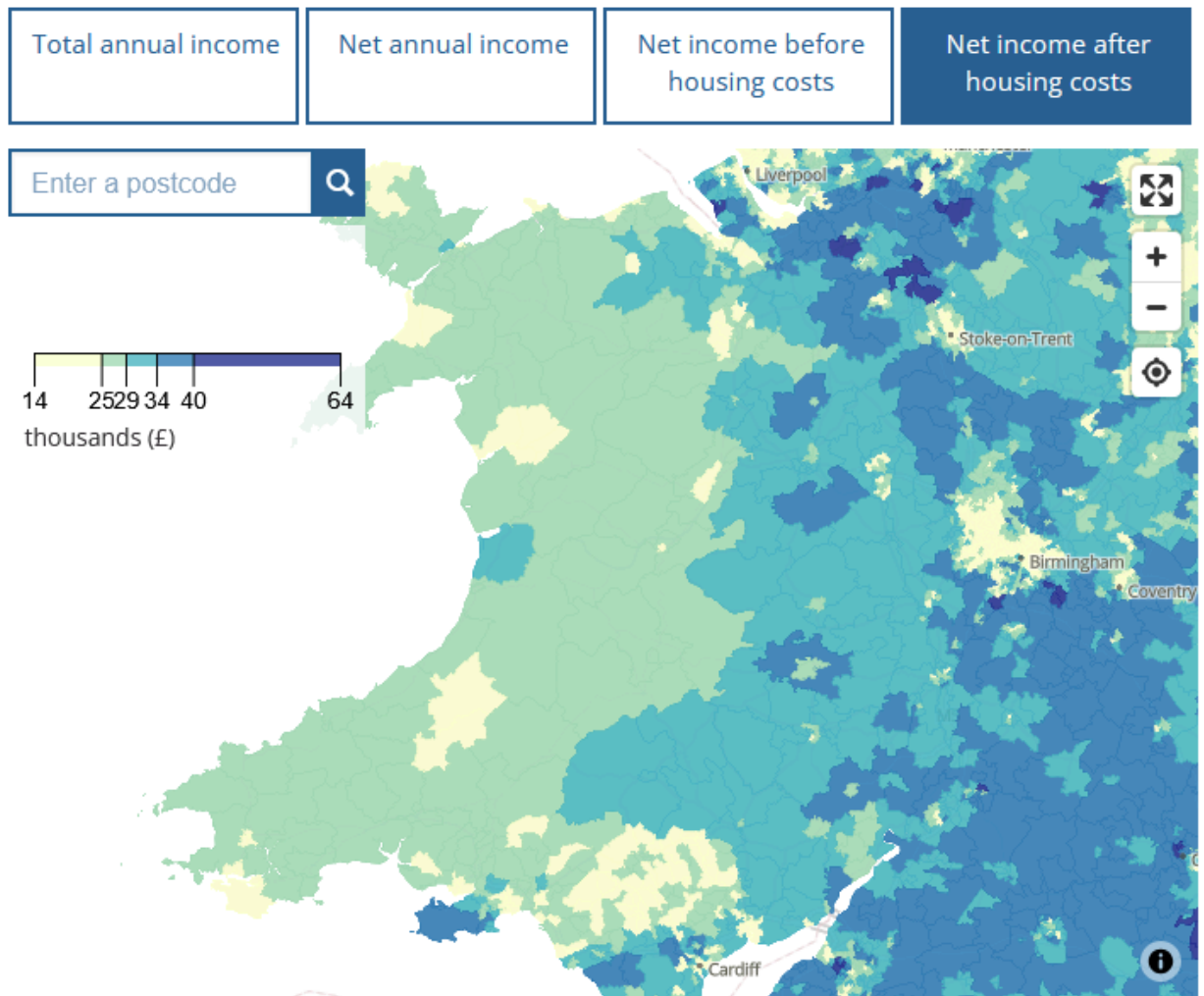


Figure 2 - Hand Drawn AoA Diagram

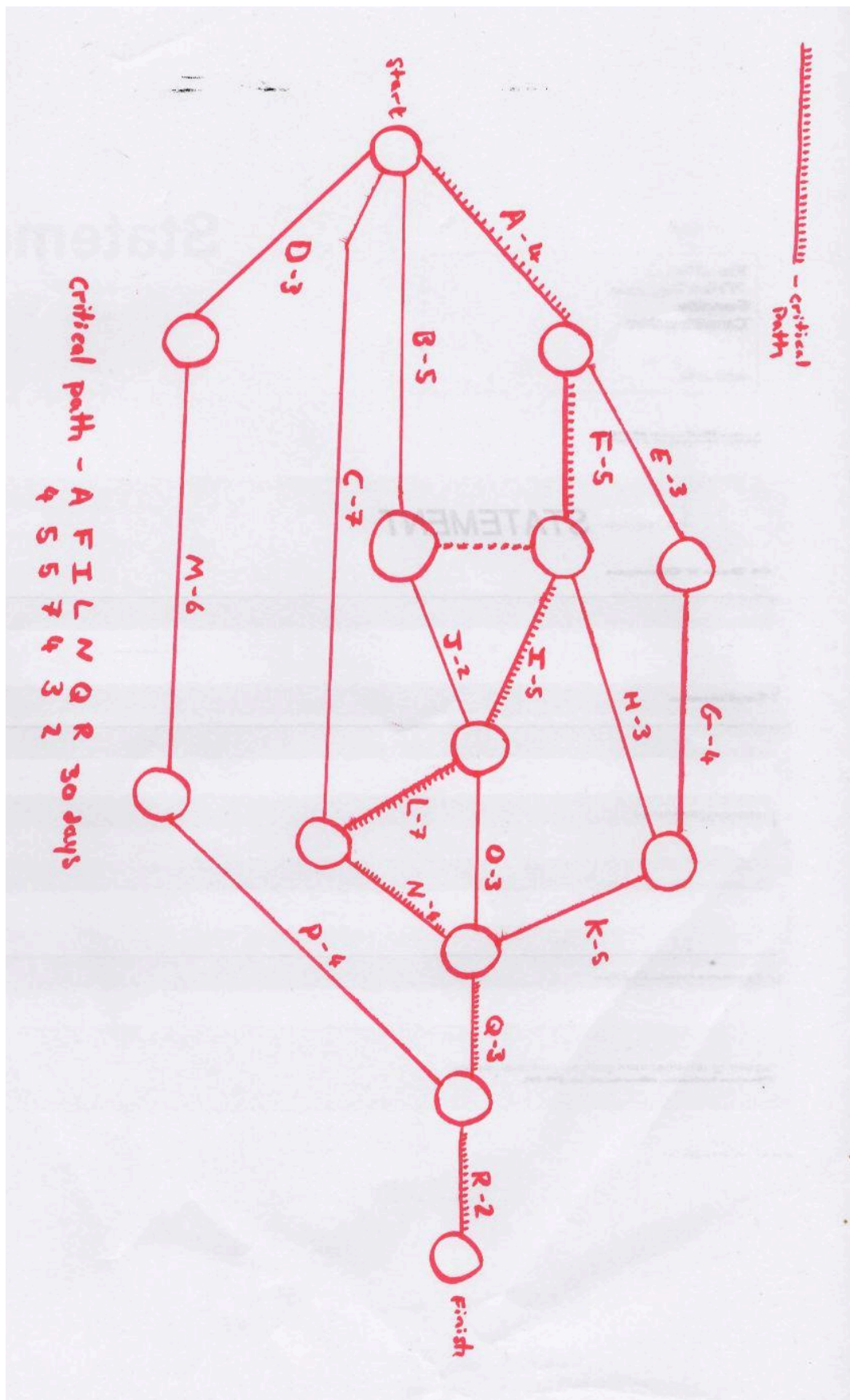


Figure 3 - Project Statistics Generated by Microsoft Project

Project Statistics for 'Project0.9'
×

	Start	Finish
Current	Thu 13/02/25	Wed 26/03/25
Baseline	NA	NA
Actual	NA	NA
Variance	0d	0d

	Duration	Work	Cost
Current	30d	0h	£0.00
Baseline	0d	0h	£0.00
Actual	0d	0h	£0.00
Remaining	30d	0h	£0.00

Percent complete:

Duration: 0%
Work: 0%

Close

Figure 4 - Gantt Chart Generated by Microsoft Project

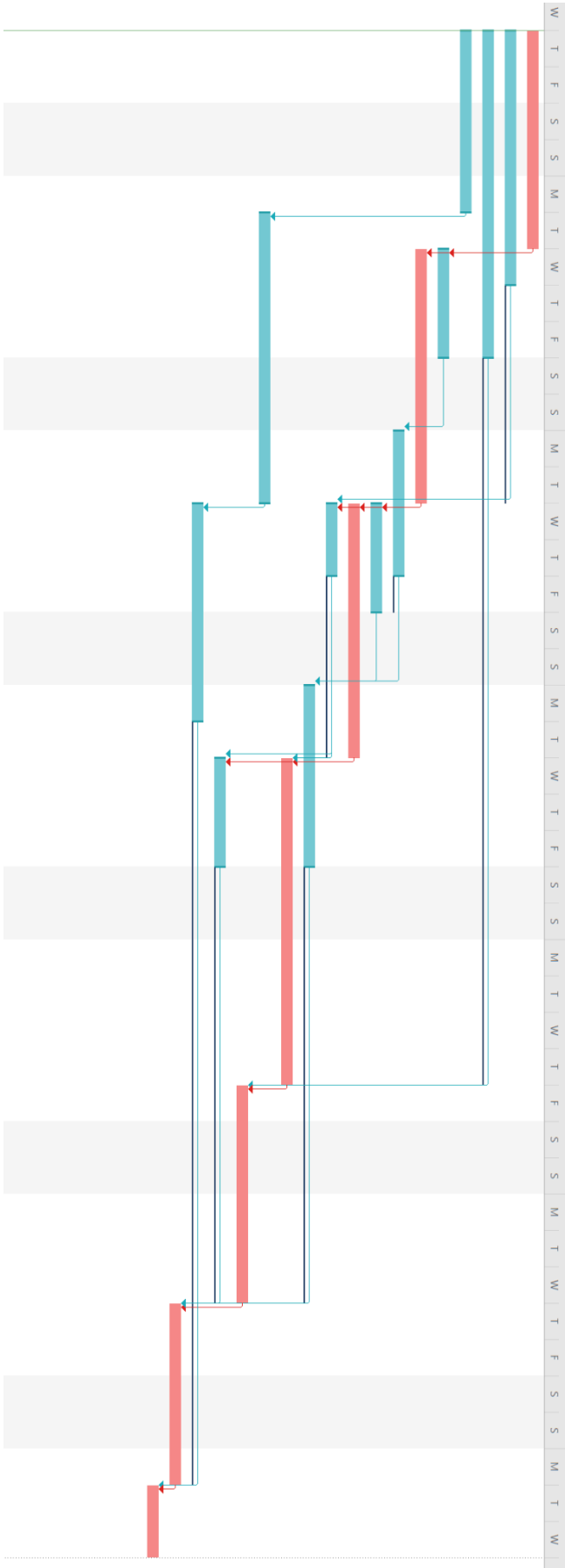


Figure 5 - Flow Diagram Generated by Microsoft Project

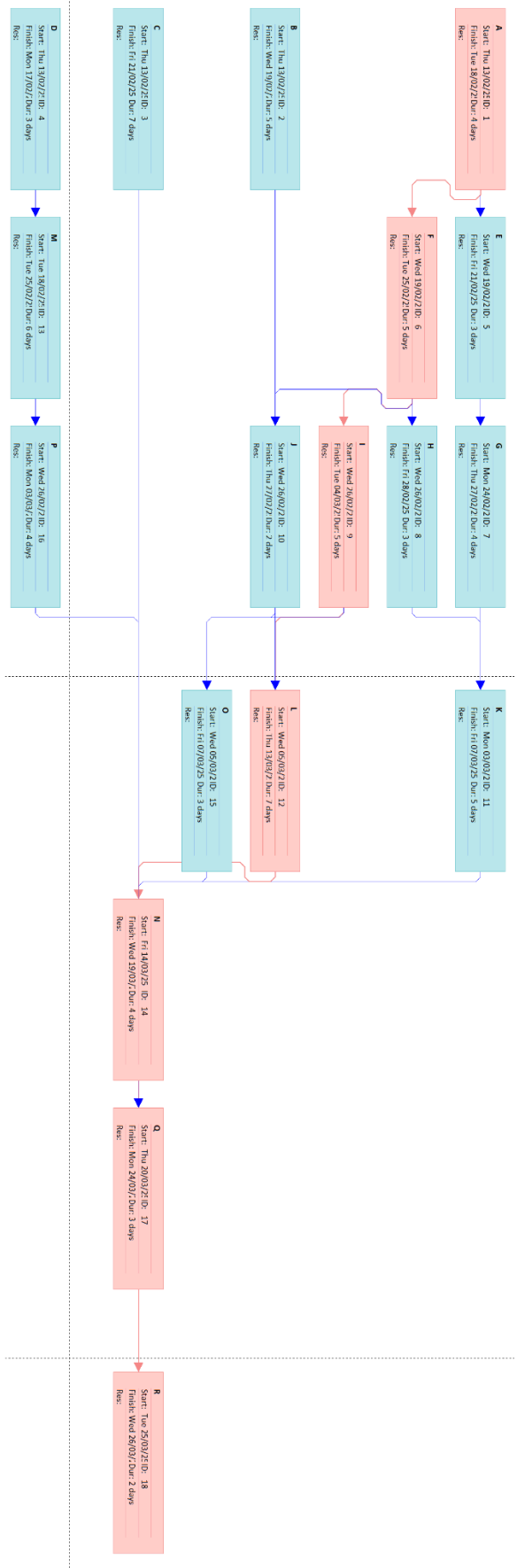


Figure 6 - Resources for the Critical Path Inputted into Microsoft Project

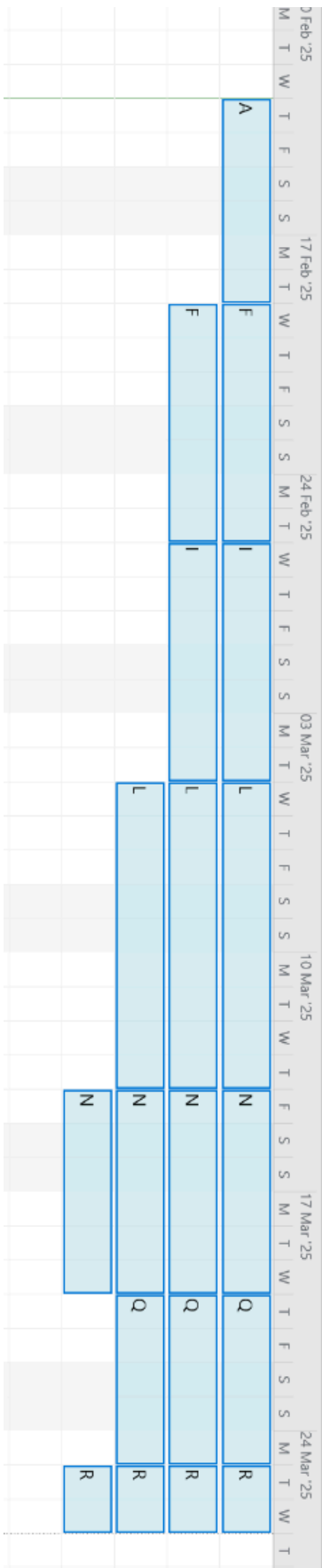


Figure 7 - Refined Resource Distribution Inputted into Microsoft Project

[illegible]

Figure 8 - Refined Gantt Chart Generated by Microsoft Project

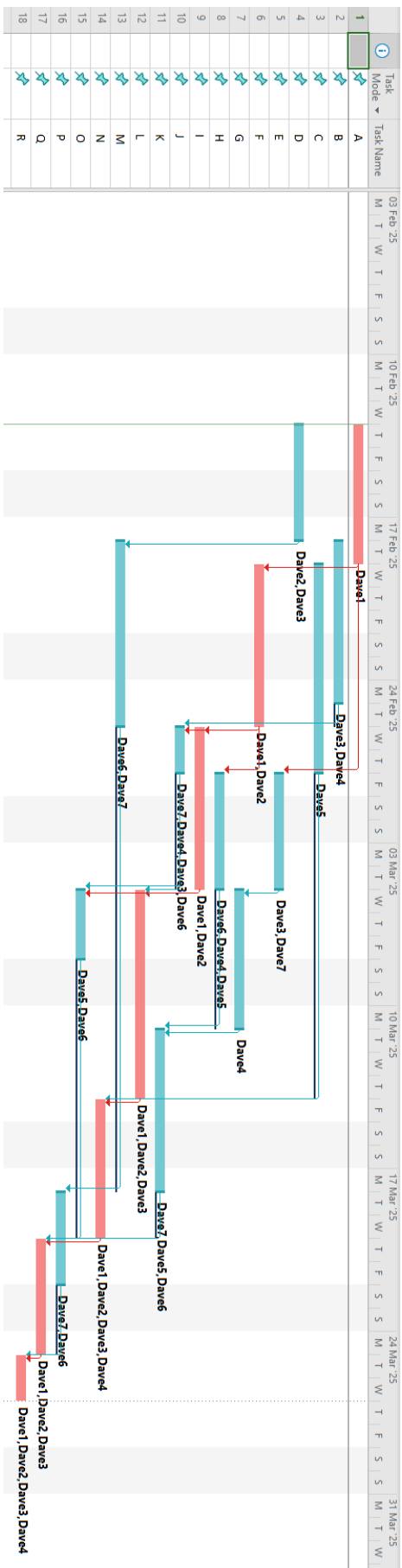


Figure 9 - Refined Projects' Statistics Generated by Microsoft Project

Project Statistics for 'Project0.9'			
	Start	Finish	
Current	Thu 13/02/25	Wed 26/03/25	
Baseline	NA	NA	
Actual	NA	NA	
Variance	0d	0d	
	Duration	Work	Cost
Current	30d	1,352h	£0.00
Baseline	0d	0h	£0.00
Actual	0d	0h	£0.00
Remaining	30d	1,352h	£0.00
Percent complete:			
Duration: 0%		Work: 0%	
			Close

Figure 10 - Final Flow Diagram Generated by Microsoft Project

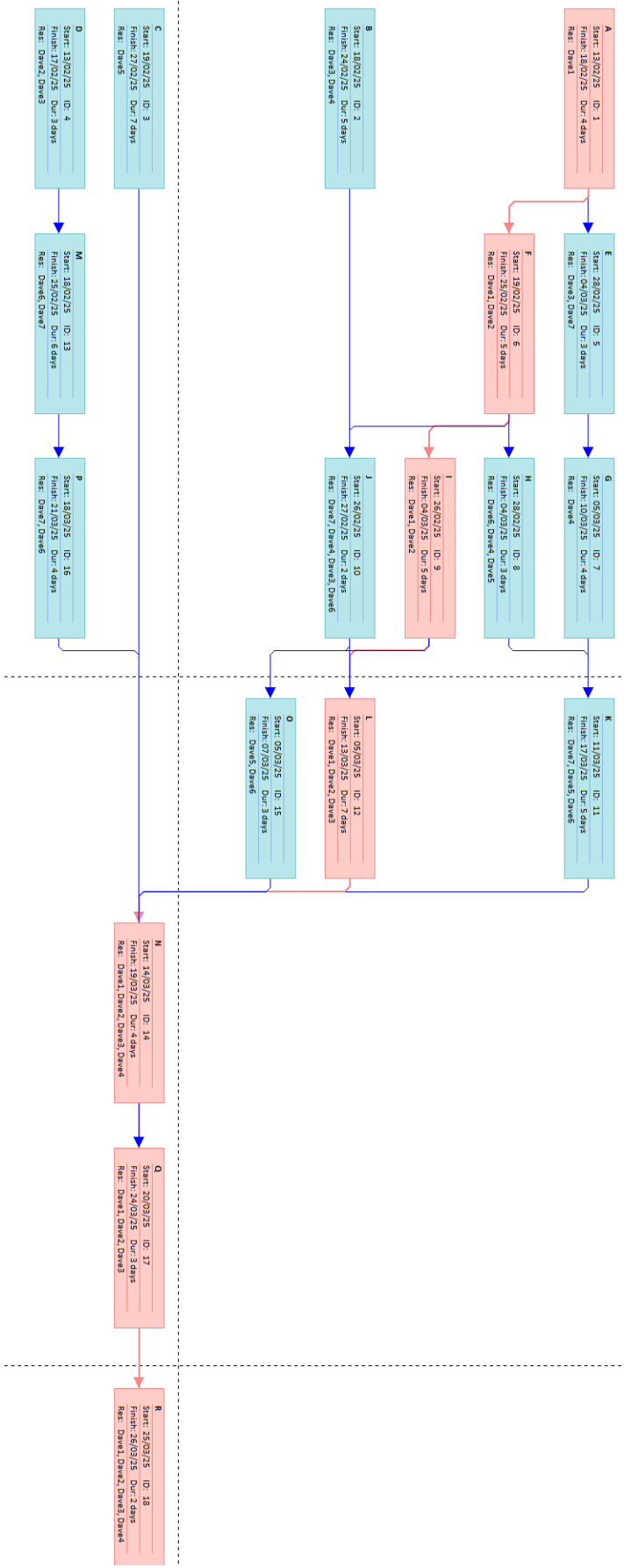


Figure 11 - Straight Line vs Accelerated (Reducing Balance) Depreciation (Boxwell, A, 2024)

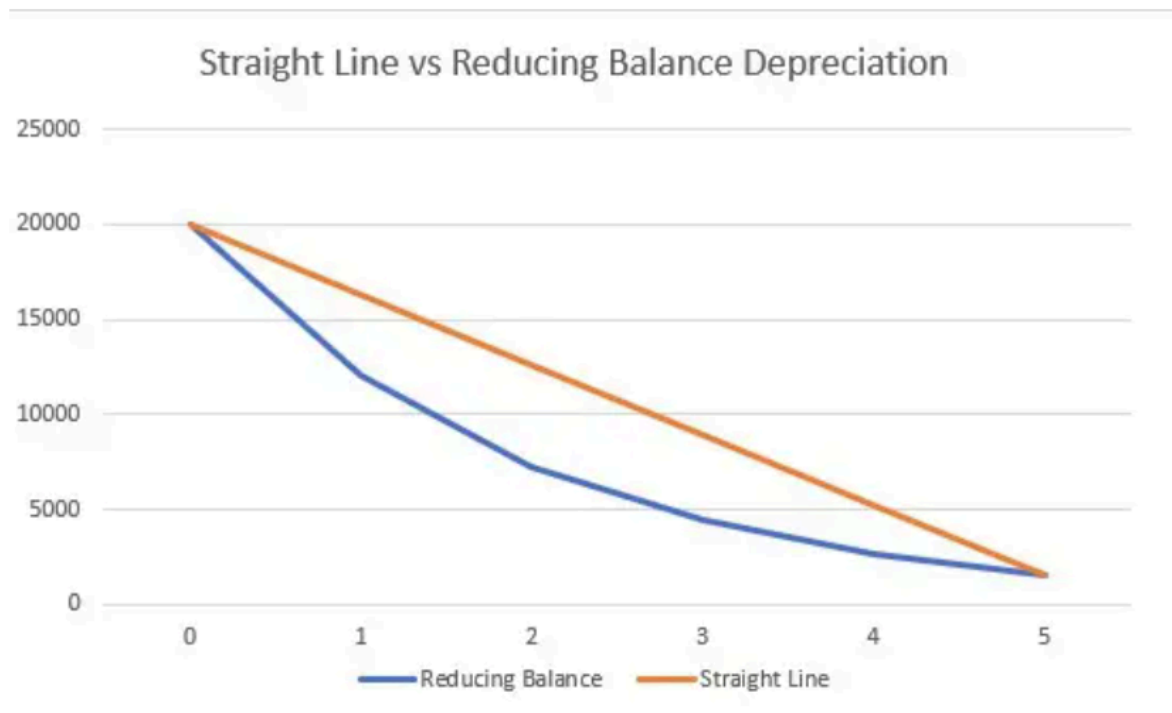


Figure 12 - Accelerated Depreciation Residual Value

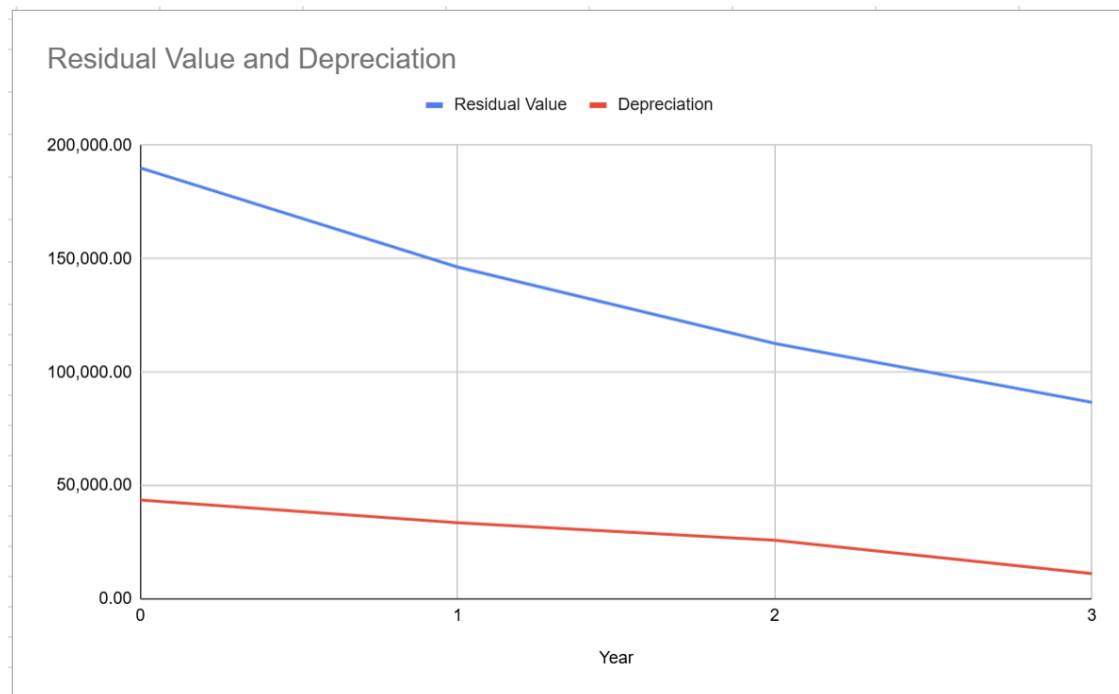


Figure 13 - Straight Line Residual Value

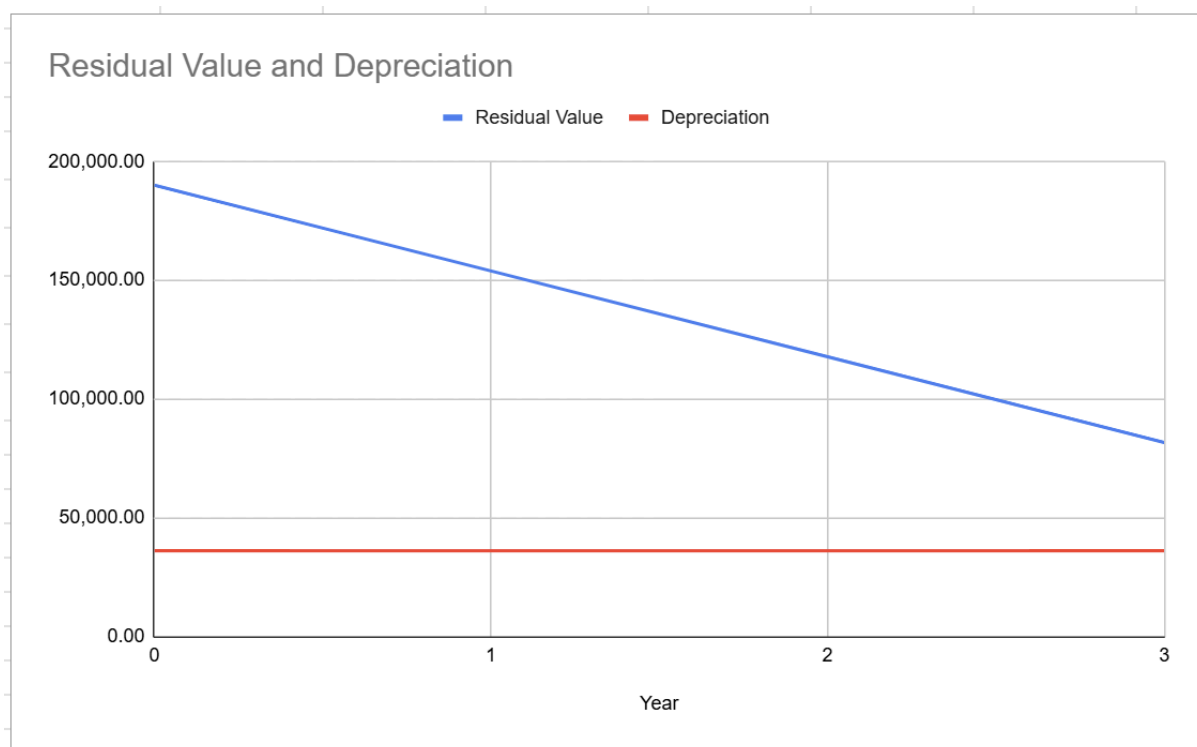


Figure 14 - Breakeven Graph for In House Manufacturing

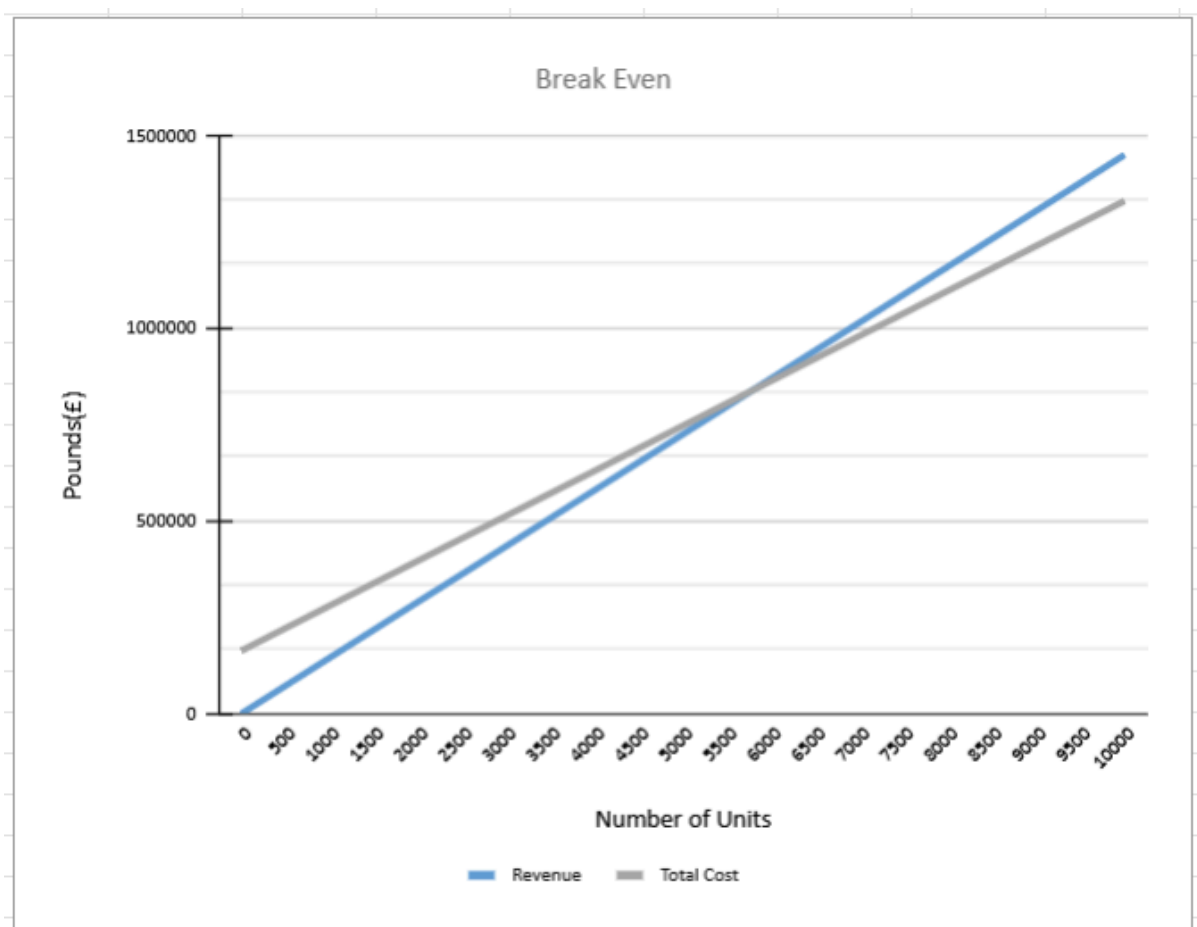
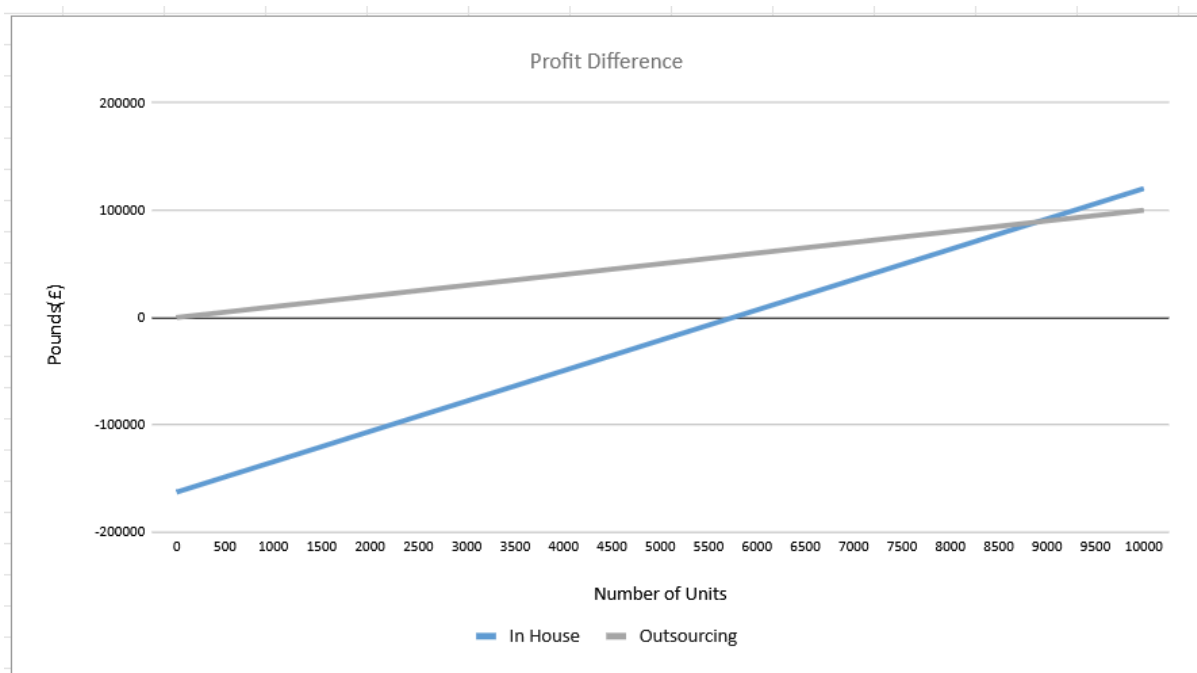


Figure 15 - Contribution Ratio for In House Manufacturing

Contribution Ratio								
Unit Price	145							
Unit Variable Cost	116.7							
Contribution Ratio =	$\frac{\text{Unit Price} - \text{Unit Variable Cost}}{\text{Unit Price}}$		=	19.5%				
Contribution Sales Volumes	=	No of Units x Unit Price x Contribution Ratio - Fixed Costs						
5000		-21500						
7000		35100						
9000		91700						
5759.72		0.076						

Figure 16 - Graph of Profit Difference Between Outsourcing and In House Manufacturing



Appendix B - Tables

Table 1 - Project Breakdown

Task Label	Duration (days)	Predecessor Tasks	Persons Required
A	4	-	1
B	5	-	2
C	7	-	1
D	3	-	2
E	3	A	2
F	5	A	2
G	4	E	1
H	3	F	3
I	5	F	2
J	2	B, F	4
K	5	G, H	3
L	7	I, J	3
M	6	D	2
N	4	C, L	4
O	3	I, J	2
P	4	M	2
Q	3	K, N, O	3
R	2	P, Q	4

Table 2 - EST, EFT, LST and LFT Table

Task Label	Earliest Start Time (EST)	Earliest Finish Time (EFT)	Latest Start Time (LST)	Latest Finish Time (LFT)	Slack (days)
A	Day 1	Day 4	Day 1	Day 4	0
B	Day 1	Day 5	Day 5	Day 9	4
C	Day 1	Day 7	Day 15	Day 21	14
D	Day 1	Day 3	Day 16	Day 18	15
E	Day 5	Day 7	Day 14	Day 16	9
F	Day 5	Day 9	Day 5	Day 9	0
G	Day 8	Day 11	Day 17	Day 20	9
H	Day 10	Day 12	Day 18	Day 20	8
I	Day 10	Day 14	Day 10	Day 14	0
J	Day 10	Day 11	Day 13	Day 14	3
K	Day 13	Day 17	Day 21	Day 25	8
L	Day 15	Day 21	Day 15	Day 21	0
M	Day 4	Day 9	Day 19	Day 24	15
N	Day 22	Day 25	Day 22	Day 25	0
O	Day 15	Day 17	Day 23	Day 25	8
P	Day 10	Day 13	Day 25	Day 28	15
Q	Day 26	Day 28	Day 26	Day 28	0
R	Day 29	Day 30	Day 29	Day 30	0

Table 3 - Digital Project Table in Microsoft Project

	Task Mode	Task Name	Duration	Start	Finish	Predecessors	Critical	people required	R
1		A	4 days	Thu 13/02/25	Tue 18/02/25			Yes 1	
2		B	5 days	Thu 13/02/25	Wed 19/02/25			No 2	
3		C	7 days	Thu 13/02/25	Fri 21/02/25			No 1	
4		D	3 days	Thu 13/02/25	Mon 17/02/25			No 2	
5		E	3 days	Wed 19/02/25	Fri 21/02/25	1		No 2	
6		F	5 days	Wed 19/02/25	Tue 25/02/25	1		Yes 2	
7		G	4 days	Mon 24/02/25	Thu 27/02/25	5		No 1	
8		H	3 days	Wed 26/02/25	Fri 28/02/25	6		No 3	
9		I	5 days	Wed 26/02/25	Tue 04/03/25	6		Yes 2	
10		J	2 days	Wed 26/02/25	Thu 27/02/25	2,6		No 4	
11		K	5 days	Mon 03/03/25	Fri 07/03/25	7,8		No 3	
12		L	7 days	Wed 05/03/25	Thu 13/03/25	9,10		Yes 3	
13		M	6 days	Tue 18/02/25	Tue 25/02/25	4		No 2	
14		N	4 days	Fri 14/03/25	Wed 19/03/25	3,12		Yes 4	
15		O	3 days	Wed 05/03/25	Fri 07/03/25	9,10		No 2	
16		P	4 days	Wed 26/02/25	Mon 03/03/25	13		No 2	
17		Q	3 days	Thu 20/03/25	Mon 24/03/25	11,14,15		Yes 3	
18		R	2 days	Tue 25/03/25	Wed 26/03/25	16,17		Yes 4	

Table 4 - Refined Gantt Table Generated by Microsoft Project

	Task Mode	Task Name	Duration	Start	Finish	Predecessors	Critical	Yes 1	people required	Resource Names	Early Start	Early Finish	Late Start	Late Finish	Finish Slack	Start Slack	A
1	Task Mode	A	4 days	Thu 13/02/25	Tue 18/02/25			Yes 1		Dave1	Thu 13/02/25	Tue 18/02/25	Thu 13/02/25	Wed 19/02/25	0 days	0 days	
2	Task Mode	B	5 days	Tue 18/02/25	Mon 24/02/25			No 2		Dave3,Dave4	Tue 18/02/25	Mon 24/02/25	Mon 24/02/25	Mon 03/03/25	4 days	4 days	
3	Task Mode	C	7 days	Wed 19/02/25	Thu 27/02/25			No 1		Dave5	Wed 19/02/25	Thu 27/02/25	Wed 05/03/25	Fri 14/03/25	10 days	10 days	
4	Task Mode	D	3 days	Thu 13/02/25	Mon 17/02/25			No 2		Dave2,Dave3	Thu 13/02/25	Mon 17/02/25	Thu 06/03/25	Tue 11/03/25	15 days	15 days	
5	Task Mode	E	3 days	Fri 28/02/25	Tue 04/03/25			No 2		Dave3,Dave7	Fri 28/02/25	Tue 04/03/25	Tue 04/03/25	Fri 07/03/25	2 days	2 days	
6	Task Mode	F	5 days	Wed 19/02/25	Tue 25/02/25			Yes 2		Dave1,Dave2	Wed 19/02/25	Tue 25/02/25	Wed 19/02/25	Wed 26/02/25	0 days	0 days	
7	Task Mode	G	4 days	Wed 05/03/25	Mon 10/03/25			No 1		Dave4	Wed 05/03/25	Mon 10/03/25	Fri 07/03/25	Thu 13/03/25	2 days	2 days	
8	Task Mode	H	3 days	Fri 28/02/25	Tue 04/03/25			No 3		Dave6,Dave4,Dave5	Fri 28/02/25	Tue 04/03/25	Mon 10/03/25	Thu 13/03/25	6 days	6 days	
9	Task Mode	I	5 days	Wed 26/02/25	Tue 04/03/25			Yes 2		Dave1,Dave2	Wed 26/02/25	Tue 04/03/25	Wed 26/02/25	Wed 05/03/25	0 days	0 days	
10	Task Mode	J	2 days	Wed 26/02/25	Thu 27/02/25			No 4		Dave7,Dave4,Dave3,Dave	Wed 26/02/25	Thu 27/02/25	Mon 03/03/25	Wed 05/03/25	3 days	3 days	
11	Task Mode	K	5 days	Tue 11/03/25	Mon 17/03/25			No 3		Dave7,Dave5,Dave6	Tue 11/03/25	Mon 17/03/25	Thu 13/03/25	Thu 20/03/25	2 days	2 days	
12	Task Mode	L	7 days	Wed 05/03/25	Thu 13/03/25			Yes 3		Dave1,Dave3	Wed 05/03/25	Thu 13/03/25	Wed 05/03/25	Fri 14/03/25	0 days	0 days	
13	Task Mode	M	6 days	Tue 18/02/25	Tue 25/02/25			No 2		Dave6,Dave7	Tue 18/02/25	Tue 25/02/25	Tue 11/03/25	Wed 19/03/25	15 days	15 days	
14	Task Mode	N	4 days	Fri 14/03/25	Wed 19/03/25			Yes 4		Dave1,Dave2,Dave3,Dave	Fri 14/03/25	Wed 19/03/25	Fri 14/03/25	Thu 20/03/25	0 days	0 days	
15	Task Mode	O	3 days	Wed 05/03/25	Fri 07/03/25			No 2		Dave5,Dave6	Wed 05/03/25	Fri 07/03/25	Mon 17/03/25	Thu 20/03/25	8 days	8 days	
16	Task Mode	P	4 days	Tue 18/03/25	Fri 21/03/25			No 2		Dave7,Dave6	Tue 18/03/25	Fri 21/03/25	Wed 19/03/25	Tue 25/03/25	1 day	1 day	
17	Task Mode	Q	3 days	Thu 20/03/25	Mon 24/03/25			Yes 3		Dave1,Dave2,Dave3	Thu 20/03/25	Mon 24/03/25	Thu 20/03/25	Tue 25/03/25	0 days	0 days	
18	Task Mode	R	2 days	Tue 25/03/25	Wed 26/03/25			Yes 4		Dave1,Dave2,Dave3,Dave	Tue 25/03/25	Wed 26/03/25	Tue 25/03/25	Wed 26/03/25	0 days	0 days	

Table 5 - Accelerated Depreciation Table

Accelerated depreciation			
Year	#	Residual Value	Depreciation
0		190,000.00	43,700.00
1		146,300.00	33,649.00
2		112,651.00	25,909.73
3		86,741.27	11,276.37

Table 6 - Straight Line Depreciation Table

Linear Depreciation			
Year	#	Residual Value	Depreciation
0		190,000.00	36,100.00
1		153,900.00	36,100.00
2		117,800.00	36,100.00
3		81,700.00	36,100.00

Table 7 - Cost of Production for Companies A and B

Cost of production		
	Company A	Company B
Sales Revenue	£3,000,000	£3,000,000
Less cost of sales		
Plant depreciation	£700,000	£450,000
Production labour	£650,000	£850,000
Materials	£650,000	£700,000
Gross Profit	£1,000,000	£1,000,000

Table 8 - Example Annual Cost Table

The machine shop has been asked to provide ball valves at the rate of 10,000 per annum to a major automotive supplier at a fixed price of £145/unit. You have been asked to include a decision to manufacture internally or outsource based on the following:

Table 2

Annual cost information	
Marginal costs:	
Direct labour	£355 000
Direct materials	£760 000
Variable overheads (power)	£52 000
Fixed overheads:	
Rent/rates	£88 000
Administration	£75 000

Alternatively, you can outsource the valves to an overseas supplier for £135/set. Include the following information in your report to support your decision:

Table 9 - Profit/ Loss Table for In House Manufacturing

Break Even Chart: In house manufacturing								
Units	Total Revenue	Total Fixed Costs	Unit Price	Unit Cost	Total Variable Cost	Total Cost	Profit	Break Even
0	0	163000	145	116.7	0	163000	-163000	5760
500	72500	163000	145	116.7	58350	221350	-148850	5760
1000	145000	163000	145	116.7	116700	279700	-134700	5760
1500	217500	163000	145	116.7	175050	338050	-120550	5760
2000	290000	163000	145	116.7	233400	396400	-106400	5760
2500	362500	163000	145	116.7	291750	454750	-92250	5760
3000	435000	163000	145	116.7	350100	513100	-78100	5760
3500	507500	163000	145	116.7	408450	571450	-63950	5760
4000	580000	163000	145	116.7	466800	629800	-49800	5760
4500	652500	163000	145	116.7	525150	688150	-35650	5760
5000	725000	163000	145	116.7	583500	746500	-21500	5760
5500	797500	163000	145	116.7	641850	804850	-7350	5760
6000	870000	163000	145	116.7	700200	863200	6800	5760
6500	942500	163000	145	116.7	758550	921550	20950	5760
7000	1015000	163000	145	116.7	816900	979900	35100	5760
7500	1087500	163000	145	116.7	875250	1038250	49250	5760
8000	1160000	163000	145	116.7	933600	1096600	63400	5760
8500	1232500	163000	145	116.7	991950	1154950	77550	5760
9000	1305000	163000	145	116.7	1050300	1213300	91700	5760
9500	1377500	163000	145	116.7	1108650	1271650	105850	5760
10000	1450000	163000	145	116.7	1167000	1330000	120000	5760

Table 10 - Profit/ Loss Table for Outsourcing, Assuming Zero Fixed Overheads

Units	Total Revenue	Total Fixed Costs	Unit Price	Unit Cost	Total Variable Cost	Total Cost	Profit	Break Even
0	0	0	145	135	0	0	0	0
500	72500	0	145	135	67500	67500	5000	0
1000	145000	0	145	135	135000	135000	10000	0
1500	217500	0	145	135	202500	202500	15000	0
2000	290000	0	145	135	270000	270000	20000	0
2500	362500	0	145	135	337500	337500	25000	0
3000	435000	0	145	135	405000	405000	30000	0
3500	507500	0	145	135	472500	472500	35000	0
4000	580000	0	145	135	540000	540000	40000	0
4500	652500	0	145	135	607500	607500	45000	0
5000	725000	0	145	135	675000	675000	50000	0
5500	797500	0	145	135	742500	742500	55000	0
6000	870000	0	145	135	810000	810000	60000	0
6500	942500	0	145	135	877500	877500	65000	0
7000	1015000	0	145	135	945000	945000	70000	0
7500	1087500	0	145	135	1012500	1012500	75000	0
8000	1160000	0	145	135	1080000	1080000	80000	0
8500	1232500	0	145	135	1147500	1147500	85000	0
9000	1305000	0	145	135	1215000	1215000	90000	0
9500	1377500	0	145	135	1282500	1282500	95000	0
10000	1450000	0	145	135	1350000	1350000	100000	0