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Financial Analysis and Strategic Investment: A Case Study of Samsung Electronics

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PART ONE

CASE STUDY COMPETITIVE REVIEW

1.0 Introduction

Samsung Electronics has shown notable business growth and resilience. Strategic investments in R&D have bolstered its market position across semiconductors, display technology, and consumer electronics. Despite supply chain challenges, Samsung's diverse product portfolio and strong global supply chain have maintained its competitive edge.

1.1 Consolidated Statements of Financial Position

Prior to conducting any analysis, key elements from the balance sheet and income statement for 2021 to 2023:

Balance Sheet	In Millions of KRW (Korean Won)		
Current Assets	2021	2022	2023
Cash and cash equivalents	39,031,415	49,680,710	69,080,893
Short-term financial instruments	81,708,986	65,102,886	22,690,924
Short-term financial assets at amortized cost	3,369,034	414,610	608,281
Short-term financial assets at fair value through profit or loss	40,757	29,080	27,112
Trade receivables	40,713,415	35,721,563	36,647,393
Non-trade receivables	4,497,257	6,149,209	6,633,248
Prepaid expenses	2,336,252	2,867,823	3,366,130
Inventories	41,384,404	52,187,866	51,625,874
Other current assets	5,081,665	6,316,834	5,038,838
Assets held-for-sale	0	0	217,864
Total Current Assets	218,163,185	218,470,581	195,936,557
Non-Current Assets			
Financial assets at fair value through other comprehensive income	13,965,839	11,397,012	7,481,297
Financial assets at fair value through profit or loss	1,525,344	1,405,468	1,431,394
Investment in associates and joint ventures	8,932,251	10,893,869	11,767,444
Property, plant and equipment	149,928,539	168,045,388	187,256,262
Intangible assets	20,236,244	20,217,754	22,741,862
Net defined benefits assets	2,809,590	5,851,972	4,905,219

Deferred income tax assets	4,261,214	5,101,318	10,211,797
Other non-current assets	6,798,952	7,041,145	14,174,148
Total Non-Current Assets	208,457,973	229,953,926	259,969,423
Total Assets	426,621,158	448,424,507	455,905,980
Current Liabilities			
Trade payables	13,453,351	10,644,686	11,319,824
Short-term borrowings	13,687,793	5,147,315	7,114,601
Other payables	15,584,866	17,592,366	15,324,119
Advances received	1,224,812	1,314,934	1,492,602
Withholdings	1,294,052	1,298,244	892,441
Accrued expenses	27,928,031	29,211,487	26,013,273
Current income tax liabilities	6,749,149	4,250,397	3,358,715
Current portion of long-term liabilities	1,329,968	1,089,162	1,308,875
Provisions	5,372,872	5,844,907	6,524,876
Other current liabilities	1,492,239	1,951,354	2,308,472
Liabilities held-for-sale	0	0	61,654
Total Current Liabilities	88,117,133	78,344,852	75,719,452
Non-Current Liabilities			
Debentures	508,232	536,093	537,618
Long-term borrowings	2,866,156	3,560,672	3,724,850
Long-term other payables	2,991,440	2,753,305	5,488,283
Net defined benefit liabilities	465,884	268,370	456,557
Deferred income tax liabilities	23,198,205	5,111,332	620,549
Long-term provisions	2,306,994	1,928,518	2,878,450
Other non-current liabilities	1,267,183	1,171,761	2,802,356
Total Non-Current Liabilities	33,604,094	15,330,051	16,508,663
Total Liabilities	121,721,227	93,674,903	92,228,115
Equity Attributable to Owners of Company			
Preference shares	119,467	119,467	119,467
Ordinary Shares	778,047	778,047	778,047
Share premium	4,403,893	4,403,893	4,403,893
Retained earnings	293,064,763	337,946,407	346,652,238
Other components of equity	-2,128,473	1,938,328	1,280,130
Total Equity Attributable to owners of company	296,237,697	345,186,142	353,233,775
Non-controlling interests	8,662,234	9,563,462	10,444,090
Total Equity	304,899,931	354,749,604	363,677,865
Total Liabilities and Equity	426,621,158	448,424,507	455,905,980

Table 1: Balance sheet (In millions of KRW)

The income statement for 2021 to 2023:

	In Millions of KRW (Korean Won)		
Income Statement	2021	2022	2023
Revenue	279,604,799	302,231,360	258,935,494
Cost of Sales	166,411,342	190,041,770	180,388,580
Gross Profit	113,193,457	112,189,590	78,546,914
Selling and administrative expenses	61,559,601	68,812,960	71,979,938
Operative Profit	51,633,856	43,376,630	6,566,976
Other non-operating income	2,205,695	1,962,071	1,180,448
Other non-operating expense	2,055,971	1,790,176	1,083,327
Share of net profit of associates and joint ventures	729,614	1,090,643	887,550
Financial income	8,543,187	20,828,995	16,100,148
Financial expense	7,704,554	19,027,689	12,645,530
Profit before income tax	53,351,827	46,440,474	11,006,265
Income tax expense/(benefit)	13,444,377 (expense)	9,213,603 (expense)	4,480,835 (benefit)
Net Profit for the year	39,907,450	55,654,077	15,487,100
Net Profit attributable to owners of company	39,243,791	54,730,018	14,473,401
Net Profit attributable to non-controlling interests	663,659	924,059	1,013,699
Earnings per share			
- Basic	5,777	8,057	2,131
- Diluted	5,777	8,057	2,131

Table 2: Income Statement (In millions of KRW)

1.2 Key Items from Financial Statements

Year	Revenue	Gross Profit	Operating Profit	Net Profit
2021	279,604,799	113,193,457	51,633,856	39,907,450
2022	302,231,360	112,189,590	43,376,630	55,654,077
2023	258,935,494	78,546,914	6,566,976	15,487,100

Table 3: Sales and Profit Margins (In millions of KRW)

1.2.0 Analyzing Market Performance via Profit Margins and Sales Trends

The sharp revenue decline in 2023, suggests that Samsung struggled to maintain profitability amidst macroeconomic uncertainties and weaker demand (“Samsung warns of worse profit falls”, 2024).

1.3 Management Ratios

The management ratios are essential tools used to evaluate a company's performance in different areas: Performance, Efficiency, Risk, and Liquidity (PERL).

Ratio	Formula (De Coster, 2018a)	2022	2023
Profitability Ratios			
Return on Assets (ROA)	$(\text{Net Profit} / \text{Total Assets}) * 100$	12.41%	3.40%
Return on Invested Capital (ROIC)	$(\text{EBIT} / (\text{Total Equity Capital} + \text{Long-term Borrowing})) * 100$	12.13%	1.79%
Return on Equity (ROE)	$(\text{Net Profit} / \text{Total Equity}) * 100$	15.69%	4.26%
Efficiency Ratios			
Asset Turnover Ratio	$\text{Revenue} / \text{Total Assets}$	0.67	0.57
Inventory Turnover Ratio	$\text{Cost of Sales} / \text{Average Inventory}$	4.06	3.48
Risk (Leverage) Ratios			
Debt to Equity Ratio	$\text{Total Liabilities} / \text{Total Equity}$	0.26	0.25
Interest Coverage Ratio	$\text{Operating Profit} / \text{Interest Expense}$	2.28	0.52
Liquidity Ratios			
Current Ratio	$\text{Current Assets} / \text{Current Liabilities}$	2.79	2.59
Quick Ratio	$(\text{Current Assets} - \text{Inventories}) / \text{Current Liabilities}$	2.12	1.91

Table 4: PERL Ratios for Samsung (2022 - 2023)

1.3.0 Evaluating Market Performance via Management Ratios

Profitability Ratios Analysis: ROA fell from 12.41% to 3.40%, which according to Ayodele (2015) indicates a decrease in the company's ability to generate profit from its assets. ROIC dropped from 12.13% to 1.79%, which according to Ayodele (2015) implies that the

company is generating less profit per dollar of capital invested. Similarly, ROE decreased from 15.69% to 4.26%, which according to Ayodele (2015) shows that the company is generating less profit per dollar of shareholders' equity.

Efficiency Ratios Analysis: The Asset Turnover Ratio fell from 0.67 in 2022 to 0.57 in 2023, which according to Adedeji (2014) suggests that the company is generating less revenue per unit of asset. The Inventory Turnover Ratio also decreased from 4.06 to 3.47, which according to Adedeji (2014) implies that the company is selling its inventory more slowly, which can be a sign of declining demand, overstocking, or issues with inventory management.

Risk (Leverage) Ratios Analysis: Risk ratios indicate Samsung's conservative leverage strategy, with the Debt to Equity Ratio slightly decreasing from 0.26 in 2022 to 0.25 in 2023. However, the Interest Coverage Ratio dropped significantly from 2.28 to 0.52, which according to Ayodele (2015) suggests that the company's earnings before interest and taxes (EBIT) have decreased relative to its interest obligations, which could signal deteriorating profitability or increased debt levels.

Liquidity Ratios Analysis: The Current Ratio and quick ratio dropped from 2.79 in 2022 to 2.59 in 2023, and from 2.12 in 2022 to 1.91 in 2023 respectively, which according to Adedeji (2014) typically indicates a decline in the company's liquidity position meaning that the company might be facing more difficulty in covering its short-term liabilities with its short-term assets.

1.4 Samsung's Current Business and Market Overview

Recent Business Performance

Samsung's recent business results show key financial metrics (revenue, gross profit, and operating profit) declining from 2022 to 2023, indicating significant challenges likely due to

macroeconomic uncertainties and weaker demand in key markets (“Samsung warns of worse profit falls”, 2024).

Customer and Competitive Situation

The drop in profitability indicates rising pressure from cheaper and more innovative rivals. In 2023, Apple surpassed Samsung to become the world’s largest smartphone manufacturer by volume, ending Samsung’s 12-year streak as they shifted focus to the mid and high-end markets for greater profitability (“Apple claims top spot, outshining Samsung”, 2024). Samsung must meet customer preferences demands while maintaining profitability to sustain its market position.

1.5 Business Growth: IoT Router for Smart Homes

An integral part of Samsung’s vision is to connect devices and make them intelligent, and thanks to a robust portfolio of products including TVs, appliances, and smartphones, along with Samsung’s leadership in delivering 5G connectivity, the company is well-positioned to deliver an open IoT ecosystem via SmartThings, built on open innovation and personalised user experiences (“Samsung Delivers Vision for Intelligent IoT Experiences”, 2018)

1.5.0 Business Approaches to Enter the IoT Market

- **Utilize Big Data:** IoT generates massive amounts of data, which can be mind for insights about customers, business processes, and trends (Krotov, 2017), thus Samsung should develop capabilities to use this data to enhance decision-making (krotov, 2017).

- **Identifying Collaborating Partners:** Establish a value network with collaborating partners, including firms, customers, and stakeholders (Chan, 2015). This network-centric approach emphasizes collaboration for value creation (Chan, 2015).
- **Develop a Comprehensive IoT Strategy:** Samsung should formulate an IoT strategy that aligns with the overall business goals, and according to Constantinescu and Edu (2022), considers technological advancements, market trends, and the specific needs of the business.
- **Invest in IoT Infrastructure:** Samsung should allocate resources to build a robust IoT infrastructure, which according to Constantinescu and Edu (2022) includes sensors, connectivity solutions, and data processing capabilities, all of which are crucial for enabling real-time data collection and analysis.
- **Consider Legal and Privacy Issues:** Address legal and privacy concerns associated with IoT applications and ensuring compliance with regulations and safeguarding consumer privacy are critical for the successful adoption of IoT solutions (Krotov, 2017).

PART TWO

INVESTMENT APPRAISAL

2.0 Introduction

This section analyzes Samsung's potential £5.8 million investment in developing an IoT router, with projected annual sales of 5 times £1,745,000 from Year 1 to Year 5. The evaluation includes calculating Net Present Value (NPV), conducting a sensitivity analysis on NPV, and determining the Internal Rate of Return (IRR):

2.1 Net Present Value (NPV)

To calculate the NPV, we first need to determine the following:

Expected Annual Sales Revenue

$$5 * £1,745,000 = £8,725,000$$

Annual Profit

$$\text{Profit margin} = 25\%$$

$$\text{Annual Profit} = 25\% \text{ of } £8,725,000 = £2,181,250$$

Cash flow over the project's life

$$\text{Initial investment (Year 0)} = -£5,800,000$$

$$\text{Annual Profit (Years 1 to 5)} = £2,181,250$$

Calculating NPV

The formula for NPV according to Atrill (2017) is

$$NPV = \sum \frac{CF_n}{(1+r)^n} - C_0 \text{ (pp. 155 - 158)}$$

Where

- CF_n is the cash flow in year n
- r is the discount rate (10% or 0.10)
- C_0 is the initial investment

Calculating each year's discounted cash flow:

$$\text{Year 1} = \frac{£2,181,250}{(1 + 0.10)^1} \approx £1,982,954.54$$

$$\text{Year 2} = \frac{£2,181,250}{(1 + 0.10)^2} \approx £1,802,685.95$$

$$\text{Year 3} = \frac{£2,181,250}{(1 + 0.10)^3} \approx £1,638,805.41$$

$$\text{Year 4} = \frac{£2,181,250}{(1 + 0.10)^4} \approx £1,489,823.10$$

$$\text{Year 5} = \frac{£2,181,250}{(1 + 0.10)^5} \approx £1,354,384.64$$

$$\text{Total discounted cash flows} = \text{Year 1} + \text{Year 2} + \text{Year 3} + \text{Year 4} + \text{Year 5}$$

$$\text{Total discounted cash flows} = £8,268,653.64$$

Finally subtract the initial investment to get the NPV:

$$NPV = £8,268,653.64 - £5,800,000 = \mathbf{£2,468,653.64}$$

The Net Present Value (NPV) of the IoT Router investment for Samsung at a 10% discount rate is **£2,468,653.64**. A positive NPV indicates a net gain (Atrill, 2017), making it a financially sound decision for Samsung to invest £5.8 million in this project (p. 157).

2.2 Project Sensitivity Analysis

To examine the sensitivity of the project to sales erosion, we need to recalculate the NPV under different scenarios where sales revenue decreases by 10%, 20%, and 30%.

Original Sales Revenue Scenario (for reference)

- Annual sales revenue = £8,725,000
- Annual profit = £2,181,250
- NPV (calculated previously) = £2,468,653.64

Sales Erosion Scenarios

1. 10% Sales Erosion

$$\text{New Annual Sales Revenue} = \text{Initial Sales} \times (1 - \text{Erosion rate})$$

$$\text{New Annual Sales Revenue} = £8,725,000 \times (1 - 0.10) = £7,852,500$$

$$\text{New Annual Profit} = £7,852,500 \times 0.25 = £1,963,125$$

Calculating NPV for this scenario:

$$\text{DCF} = \frac{1,963,125}{1.1} + \frac{1,963,125}{1.21} + \frac{1,963,125}{1.331} + \frac{1,963,125}{1.4641} + \frac{1,963,125}{1.61051}$$

$$\text{Total Discounted Cash Flow (DCF)} \approx £7,441,788.28$$

$$\text{NPV}_{10\%} = £7,441,788.28 - £5,800,000 = \mathbf{£1,641,788.27}$$

2. 20% Sales Erosion

$$\text{New Annual Sales Revenue} = £8,725,000 \times (1 - 0.20) = £6,980,000$$

$$\text{New Annual Profit} = £6,980,000 \times 0.25 = £1,745,000$$

Calculating NPV for this scenario:

$$\text{DCF} = \frac{1,745,000}{1.1} + \frac{1,745,000}{1.21} + \frac{1,745,000}{1.331} + \frac{1,745,000}{1.4641} + \frac{1,745,000}{1.61051}$$

Total Discounted Cash Flow (DCF) \approx £6,614,922.91

$NPV_{20\%} = £6,614,922.91 - £5,800,000 = \textbf{£814,922.91}$

3. 30% Sales Erosion

New Annual Sales Revenue = £8,725,000 \times (1 - 0.30) = £6,107,500

New Annual Profit = £6,107,500 \times 0.25 = £1,526,875

Calculating NPV for this scenario:

$DCF = \frac{1,526,875}{1.1} + \frac{1,526,875}{1.21} + \frac{1,526,875}{1.331} + \frac{1,526,875}{1.4641} + \frac{1,526,875}{1.61051}$

Total Discounted Cash Flow (DCF) \approx £3,493,729.98

$NPV_{30\%} = £3,493,729.98 - £5,800,000 = \textbf{-£2,306,270.02}$

Sensitivity Summary Analysis

Scenario	NPV(£)
No Erosion	2,468,653.64
10% Erosion	1,641,788.27
20% Erosion	814,922.91
30% Erosion	-2,306,270.02

Table 5: Sensitivity Summary

2.3 Project Return (IRR Calculation)

According to Atrill (2017), the IRR is the discount rate at which the NPV of the project is zero (p. 162). We will increase the discount rate until the NPV turns negative to estimate the IRR. Using the original sales revenue, we will find the discount rate where $NPV = 0$. The initial investment is £5,800,000 and the annual cash flow is £2,181,250.

At 10% Discount Rate

$$\text{NPV} = \text{£2,468,653.64 (Calculated above)}$$

At 20% Discount Rate

$$\begin{aligned}\text{DCF} &= \frac{\text{£2,181,250}}{(1 + 0.20)^1} + \frac{\text{£2,181,250}}{(1 + 0.20)^2} + \frac{\text{£2,181,250}}{(1 + 0.20)^3} + \frac{\text{£2,181,250}}{(1 + 0.20)^4} + \frac{\text{£2,181,250}}{(1 + 0.20)^5} \\ &= \frac{\text{£2,181,250}}{1.2} + \frac{\text{£2,181,250}}{1.44} + \frac{\text{£2,181,250}}{1.728} + \frac{\text{£2,181,250}}{2.0736} + \frac{\text{£2,181,250}}{2.48832} \\ &\approx \text{£6,523,272.73}\end{aligned}$$

Subtracting the initial investment:

$$\text{NPV} = \text{£6,523,272.73} - \text{£5,800,000} = \text{£723,272.73}$$

At 25% Discount Rate

$$\begin{aligned}\text{DCF} &= \frac{\text{£2,181,250}}{(1 + 0.25)^1} + \frac{\text{£2,181,250}}{(1 + 0.25)^2} + \frac{\text{£2,181,250}}{(1 + 0.25)^3} + \frac{\text{£2,181,250}}{(1 + 0.25)^4} + \frac{\text{£2,181,250}}{(1 + 0.25)^5} \\ &= \frac{\text{£2,181,250}}{1.25} + \frac{\text{£2,181,250}}{1.5625} + \frac{\text{£2,181,250}}{1.953125} + \frac{\text{£2,181,250}}{2.44140625} + \frac{\text{£2,181,250}}{3.0517578125} \\ &= \text{£5,865,992}\end{aligned}$$

Subtracting the initial investment:

$$\text{NPV} = \text{£5,865,992} - \text{£5,800,000} = \text{£65,992}$$

At 30% Discount Rate

$$\begin{aligned}\text{DCF} &= \frac{\text{£2,181,250}}{(1 + 0.3)^1} + \frac{\text{£2,181,250}}{(1 + 0.3)^2} + \frac{\text{£2,181,250}}{(1 + 0.3)^3} + \frac{\text{£2,181,250}}{(1 + 0.3)^4} + \frac{\text{£2,181,250}}{(1 + 0.3)^5} \\ &= \frac{\text{£2,181,250}}{1.3} + \frac{\text{£2,181,250}}{1.69} + \frac{\text{£2,181,250}}{2.197} + \frac{\text{£2,181,250}}{2.8561} + \frac{\text{£2,181,250}}{3.71293} \\ &\approx \text{£5,312,586.52}\end{aligned}$$

Subtracting the initial investment:

$$\text{NPV} = \text{£}5,312,586.52 - \text{£}5,800,000 = -\text{£}487,413.48$$

The NPV turns negative between the 25% and 30% discount rates. To find the exact IRR, we can interpolate between these values.

Interpolating for IRR

According to De Coster (2018b), the formula for interpolation is:

$$IRR = d_1 + [(d_2 - d_1) \times \frac{n_1}{n_1 - n_2}] \text{ (pp. 5-13)}$$

Where:

- $d_1 = 25\%$ (Lower discount rate)
- $d_2 = 30\%$ (Higher discount rate)
- $n_1 = \text{£}65,992$ (NPV at lower discount rate)
- $n_2 = -\text{£}487,413.48$ (NPV at higher discount rate)

Therefore, the IRR:

$$= 25\% + [(30\% - 25\%) \times \frac{\text{£}65,992}{\text{£}65,992 - (-\text{£}487,413.48)}]$$

$$= 25\% + [(5\%) \times \frac{\text{£}65,992}{\text{£}65,992 + \text{£}487,413.48}]$$

$$= 25\% + [5\% \times 0.1192]$$

$$= 25\% + 0.596\%$$

$$\therefore IRR \approx 25.60\%$$

2.3.0 Discussion of IRR Result

When the IRR of 25.60% is significantly higher than the discount rate of 10%, it indicates strong profitability and financial feasibility, suggesting that the project will generate substantial returns above the cost of capital. This high IRR can justify prioritizing the project, enhance investor confidence, and provide a competitive advantage. However, senior staff should ensure that the high returns justify the potential risks through thorough risk analysis (Lin, 2023).

PART THREE

BUSINESS PLANNING AND BUDGETING

3.0 Introduction

This section analyzes a UK IoT router production facility with two lines, producing 5,000 and 15,000 units annually. Total overheads are £4,450,000, allocated by volume, and profitability is assessed through a Contribution Statement and CVP Charts. Two scenarios are evaluated:

1. High-value router at £600 on Line 1 and mid-range router at £300 on Line 2, with variable costs at one-third of sales revenues.
2. Increased part/material costs reducing the mid-range router's contribution to half of sales revenues.

3.1 Contribution Statement (Initial Scenario)

1. Line 1 (High Value Router)

- Sales price per unit: £600
- Units Produced: 5000
- Sales Revenue: $£600 \times 5000 = £3,000,000$
- Total Annual Overheads: £4,450,000
- Total Production Capacity: 20000
- Total Variable costs (one-third of sales revenue): $£3,000,000 \times \frac{1}{3} = £1,000,000$
 - Parts/Materials: £333,333
 - Direct labor: £333,333
 - Machining Cost: £333,333
- Fixed Costs Allocation by Volume = $\frac{5000}{20000} \times £4,450,000 = £1,112,500$

2. Line 2 (Mid-range Router)

- Sales price per unit: £300
- Units Produced: 15000
- Sales Revenue: $£300 \times 15000 = £4,500,000$
- Total Annual Overheads: £4,450,000
- Total Production Capacity: 20000
- Total Variable costs (one-third of sales revenue): $£4,500,000 \times \frac{1}{3} = £1,500,000$
 - Parts/Materials: £500,000
 - Direct labor: £500,000
 - Machining Cost: £500,000
- Fixed Costs Allocation by Volume = $\frac{15000}{20000} \times £4,450,000 = £3,337,500$

Total

- Sales Revenue: $£3,000,000 + £4,500,000 = \textbf{£7,500,000}$
- Total Variable Costs: $£1,000,000 + £1,500,000 = \textbf{£2,500,000}$
- Fixed Costs: $£1,112,500 + £3,337,500 = \textbf{£4,450,000}$
- Profit/Loss: $£7,500,000 - £2,500,000 - £4,450,000 = \textbf{£550,000}$

Sales Units	5000 (Line 1)	15,000 (Line 2)	20,000 (Total)
Sales revenues	£3,000,000	£4,500,000	£7,500,000
Less: Parts/Materials	-£333,333	-£500,000	-£833,333
Machining Cost	-£333,333	-£500,000	-£833,333
Direct Labour	-£333,333	-£500,000	-£833,333
Total Variable costs	-£1,000,000	-£1,500,000	-£2,500,000
Production Contribution	£2,000,000	£3,000,000	£5,000,000
Less: Fixed Costs	-£1,112,500	-£3,337,500	-£4,450,000
Profit/Loss	£887,500	-£337,500	£550,000

Table 6: Contribution Statement (Initial Scenario)

3.1.0 Contribution Statement (Revised Scenario)

In the revised scenario, the cost of parts/materials for the mid-range product increases to half of sales revenue.

Line 2 (Mid-range Router)

- Sales price per unit: £300
- Units Produced: 15000
- Sales Revenue: $£300 \times 15000 = £4,500,000$
- Total Annual Overheads: £4,450,000
- Total Production Capacity: 20000
- Total Variable costs (half of sales revenue): $£4,500,000 \times \frac{1}{2} = £2,250,000$
 - Parts/Materials: £750,000
 - Direct labor: £750,000
 - Machining Cost: £750,000
- Fixed Costs Allocation by Volume = $\frac{15000}{20000} \times £4,450,000 = £3,337,500$

Total

- Sales Revenue: $£3,000,000 + £4,500,000 = \text{£7,500,000}$
- Total Variable Costs: $£1,000,000 + £2,250,000 = \text{£3,250,000}$
- Fixed Costs: $£1,112,500 + £3,337,500 = \text{£4,450,000}$
- Profit/Loss: $£7,500,000 - £3,250,000 - £4,450,000 = -\text{£200,000}$

Sales Units	5000 (Line 1)	15,000 (Line 2)	20,000 (Total)
Sales revenues	£3,000,000	£4,500,000	£7,500,000
Less: Parts/Materials	-£333,333	-£750,000	-£1,083,333
Machining Cost	-£333,333	-£750,000	-£1,083,333
Direct Labour	-£333,333	-£750,000	-£1,083,333
Total Variable costs	-£1,000,000	-£2,250,000	-£3,250,000
Production Contribution	£2,000,000	£2,250,000	£4,250,000
Less: Fixed Costs	-£1,112,500	-£3,337,500	-£4,450,000
Profit/Loss	£887,500	-£1,087,500	-£200,000

Table 7: Contribution Statement (Revised Scenario)

3.1.1 Return on Sales (ROS)

Initial Scenario

- Product Contribution: £5,000,000
- Profit/Loss: £550,000
- Sales revenue: £7,500,000

$$\text{Return on Sales (ROS)}: \frac{\text{Net Profit}}{\text{Sales Revenue}} \times 100\% = \frac{550,000}{7,500,000} \times 100\% = 7.33\%$$

Revised Scenario (Increased Parts/Materials cost for mid-range product)

- Product Contribution: £5,000,000
- Profit/Loss: – £200,000
- Sales revenue: £7,500,000

$$\text{Return on Sales (ROS)}: \frac{\text{Net Profit}}{\text{Sales Revenue}} \times 100\% = \frac{-200,000}{7,500,000} \times 100\% = -2.67\%$$

3.2 Cost-Volume-Profit Analysis Chart

A Cost-Volume-Profit (CVP) chart, or break-even chart, shows the relationship between costs, sales volume, and profits, helping to determine the break-even point where total revenues equal total costs, indicating no profit or loss (Kelly, 2019).

Units Produced	Sales Revenue	Total Costs	Profit/Loss
0	£0	£4,450,000	-£4,450,000
5000	£3,000,000	£5,450,000	-£2,450,000
15000	£4,500,000	£5,950,000	-£1,450,000
20000	£7,500,000	£6,950,000	£550,000

Table 8: CVP Chart Data (Initial)

Units Produced	Sales Revenue	Total Costs	Profit/Loss
0	£0	£4,450,000	-£4,450,000
5000	£3,000,000	£5,450,000	-£2,450,000
15000	£4,500,000	£6,700,000	-£2,200,000
20000	£7,500,000	£7,700,000	-£200,000

Table 9: CVP Chart Data (Revised)

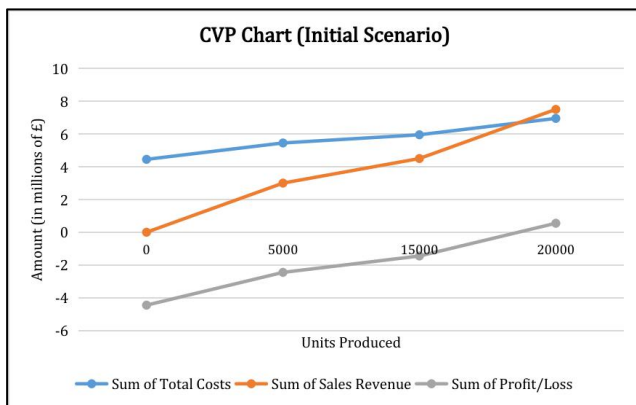


Figure 1: CVP Chart (Initial Scenario)

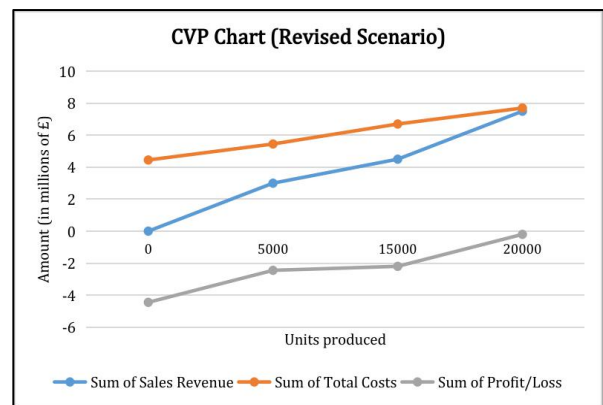


Figure 2: CVP Chart (Revised Scenario)

3.3 Profitability Review of the Overall Production Facility

Initial Scenario: With total variable costs at one-third of sales revenue, the facility is profitable. Sales revenue is £7,500,000, variable costs are £2,500,000, and fixed costs are £4,450,000, resulting in a £550,000 profit and a 7.33% ROS. The break-even point is achieved at a lower production volume, and according to Kelly (2019), this indicates higher profitability and lower risks, because the company can cover its costs and start making a profit with fewer sales.

Revised Scenario: In the revised scenario, increased parts/materials costs for the mid-range product raise total variable costs for Line 2 to half of sales revenue. Sales remain £7,500,000, but variable costs rise to £3,750,000 and fixed costs stay at £4,450,000, resulting in a £200,000 loss and a -2.67% ROS. This shows the firm's vulnerability to cost increases and the need for better cost management and pricing strategies. The break-even point is delayed,

requiring higher production volumes, which according to Kelly (2019), indicates lower profitability and higher risk because the company needs to sell more to cover its costs.

3.4 E-Commerce Opportunity for the UK Production Facility

Expanding the UK production facility to include a warehouse for online orders presents a valuable e-commerce opportunity. The cost effectiveness and competitiveness implications of this expansion:

Cost Effectiveness: Using the existing facility as a warehouse minimizes optimizes resources, as consolidating production and warehousing can lower per-unit costs, reducing shipping and handling expenses (Al-Gwaiz, 2016).

Competitiveness: A local warehouse reduces delivery times and costs, enhancing customer satisfaction and loyalty. According to Akil and Ungan (2022), expanding distribution networks and building more fulfillment centers are crucial steps for e-commerce companies to meet increasing customer expectations and improve service quality.

CONCLUSION

From 2021 to 2023, Samsung faced economic uncertainties and supply chain issues, reducing revenue and profit. Despite this, they maintained strong liquidity and conservative leverage. The investment appraisal for an IoT router shows a positive NPV and high IRR, indicating a promising opportunity. Effective cost management and operational efficiency are crucial, as shown by CVP analysis. Expanding the UK facility for online orders can enhance cost-effectiveness, competitiveness, and customer satisfaction. Strategic investments in innovation, cost management, and market expansion are essential for Samsung to achieve sustainable growth.

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