Investment appraisal in action

Curriculum Topics

- Reasons for investment
- Investment appraisal
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Introduction

Food is one of the essentials for life. Farming is therefore an industry on which everyone depends. Globally, the farming industry already faces a great challenge to produce food for the seven billion people now living on this planet. By 2050 the global population will be over nine billion. To feed this population, the United Nations estimates that food production will need to increase by 70%.

This will be a huge task. Most of the world's cultivable land is already used for farming. Global warming may reduce the overall amount of arable land. To avoid widespread hunger, more food will need to be produced from the land currently being farmed. It is not surprising then that agricultural **productivity** is high on the global agenda.

The challenge is to increase productivity through **sustainable** agriculture that does not compromise the world's natural resources for future generations. This will require improved processes and techniques and inputs from companies like Syngenta. Formed in 2000 by combining the agrochemical divisions of Zeneca and Novartis, Syngenta is one of the world's leading suppliers of seeds and crop protection systems. A **multinational** company, Syngenta employs 26,000 people across 90 countries. In 2010, its sales exceeded $11 billion.

Syngenta's mission is 'bringing plant potential to life'. It uses the latest science and technology to develop products that help its customers improve crop productivity. Syngenta's products are used by farmers to protect crops against weeds, pests and fungal diseases. The company's herbicides, pesticides and fungicides are usually based on complex chemicals. To develop products that can improve farm output without damaging the natural environment requires intensive research and development (R&D). To protect its investment, Syngenta obtains **patents** for its new products.

One of Syngenta's best-selling products is Amistar. This is the world's leading fungicide. This product is so popular that demand has outstripped supply in the past. This case study looks at how in 2008 Syngenta proposed an investment in new manufacturing capacity that would allow it to increase production of Amistar. It reviews the analyses that helped the company decide whether to proceed with this investment.

Reasons for investment

Business is about transforming inputs such as raw materials and labour into outputs. By adding value at each stage of the production process, a company hopes to generate a profit. This is when the revenue from the sale of the outputs exceeds the cost of the inputs. Profits are used to reward shareholders and can be reinvested in the business. Syngenta adds value to its basic inputs of raw materials, labour and energy through its scientific knowledge base, manufacturing expertise and marketing know-how. It uses its scientific knowledge base to develop products that are effective in protecting crops from pests and diseases. Its manufacturing capability enables it to produce high quality products cost-effectively.

GLOSSARY

Productivity: Level of output relative to level of input. Labour productivity typically measures output per person/hour.

Sustainable: A business is sustainable if its supply chain, processes and products do not compromise the environmental resources of future generations.

Multinational: A company operating in two or more countries.

Patents: Exclusive legal right to exploit an invention. Patents are granted by the Intellectual Property Office for up to 20 years.

Its marketing functions help the company to price, package, promote and distribute products to meet the needs of customers.

All businesses incur **capital costs** when buying or creating assets. These include plant, equipment, brands and knowledge. Spending money on capital assets is called **investment**. Although this is not essential expenditure in the short term, it is vital for long-term success. If a firm fails to invest then its products could become out-of-date or it may lose business to competitors that can deliver goods and services more efficiently. For example, in the last 20 years, every camera manufacturer has had to introduce new products as digital technology has replaced film as the medium for capturing images. Manufacturers that didn't invest in new products went out of business.

There are three broad motives for capital investment:

- renewal of worn out assets
- acquisition of additional assets to expand the business and increase output
- innovation to reduce costs and/or to create new value.

In practice, an investment often combines all three factors. It will aim to secure a **competitive advantage** for the organisation. This might arise from better technology, access to new markets or an exclusive innovation, such as Syngenta's Amistar fungicide.

Investment appraisal

In 2008 Syngenta was faced with a major investment decision. As the Amistar range moved through its product life cycle, maximum capacity was approached. Syngenta could not produce more Amistar without investing in its production facilities. A proposal was put forward to expand production through a £150 million investment at the Grangemouth site in Scotland. The company needed to decide whether increasing production would be financially viable and a worthwhile investment. Figure 1 summarises the initial arguments for and against the proposal.

These arguments set out some of the broad reasons for making the investment: that demand for Amistar would continue to grow and that the investment would lead to efficiency gains by increasing productivity. It was also technically feasible. Staff at Grangemouth had the essential experience and expertise. The plant had an outstanding safety and environmental record. It has an ideal location, on Scotland's 'chemical strip' alongside other chemistry-led companies and a range of key suppliers. The arguments against the investment set out some of the potential risks and downsides.

However, to make an informed decision, Syngenta had to carry out an investment appraisal. An investment appraisal involves determining whether the inflows represent a sufficient return on the original investment. This involves looking at the financial implications of the investment decision. This considers the short-term issue of funding the investment and the longer-term financial implications, in this case over a ten-year period (2008–2017). To do this, the company needed detailed financial data to assess whether the investment would produce value for shareholders.

Figure 1: Arguments for and against the investment at Grangemouth

AGAINST	FOR
• The Amistar range was already well into the maturity stage of its product life cycle. New products could come onto the market that would lead to declining sales.	• Amistar is a broad spectrum fungicide with applications for 120 crops in more than 100 countries. Demand was increasing, especially in Latin America. This investment would help to meet that demand, increasing both output and productivity by 50%.
• Patent protection ends in Europe in 2010 and in the USA by 2014. Companies in India and China are liable to start producing cheaper substitutes that could reduce Syngenta's sales.	• Azoxystrobin, the active ingredient in Amistar, can be used as a compound in many related products. New developments, potentially leading to new patents, could extend the product life cycle.
• The world economy was in a serious recession in 2008. There is a case for putting expansion plans on hold until the global economy becomes more stable.	• The Grangemouth facility already had the technical expertise and resources for a complex manufacturing process. • Global demand for food is increasing and tends to be price inelastic. This will maintain global demand for fungicides.

Projected cash flows

An investment – or capital expenditure – involves a cash outflow in the present that is expected to yield greater cash inflow in the future. To do this, managers need to produce the best available financial estimates of the cash inflows and outflows that would result from the investment.

GLOSSARY

Capital costs: Expenditure on capital assets such as plant, equipment, brands and knowledge.

Investment: Putting funds to use in the expectation of favourable returns relative to the risk involved.

Competitive advantage: An ability to earn greater profits than rival companies through lower costs or distinctive product quality that competitors cannot readily copy.

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Table 1: Estimated cash flows for Syngenta's Grangemouth expansion project

Cash flows (£ million)										
	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9
Cash inflow										
Sales		200	400	400	400	400	400	400	400	400
Total inflow		200	400	400	400	400	400	400	400	400
Cash outflow										
Investment	150									
Manufacturing costs		80	160	160	160	160	160	160	160	160
Sales and marketing		15	30	30	30	30	30	30	30	30
Other costs		25	25							
Total outflow	150	120	215	190	190	190	190	190	190	190
Net cash flow	(150)	80	185	210	210	210	210	210	210	210

Source: Syngenta (illustrative data only)

Table 1 shows estimated cash flows for the Grangemouth expansion project. The simplest method of investment appraisal is to calculate the **payback** period. This is the length of time it takes for the earnings associated with an investment project to cover the initial outlay. In other words, it is when the cumulative earnings equal the original cost of the investment. This is an application of the **break-even** principle.

As Table 1 shows, the Grangemouth expansion is expected to achieve payback during Year 2. By the end of Year 2 there would be cumulative earnings of £265m (80 +185), considerably more than the £150m initial outlay. The exact payback period is easily calculated by interpolation. Payback is achieved when £70m is earned during Year 2, as when this is added to the £80m earned in Year 1 cumulative earnings equal £150m. It follows that payback will be achieved in Year 2 after:

$$\frac{70}{185} \times 12 = 4.5 \text{ months}$$

The payback period is thus projected at 1 year 4½ months or 16½ months. This is a relatively short payback period. It is a useful pointer, but does not reflect the true value of the investment. The figure provides no information about the cash flows *after* payback and gives no indication of overall profitability.

To do this, it is usual to calculate the **average rate of return** (ARR). This is expressed as a percentage of the sum invested. To calculate the ARR for the Grangemouth expansion project, it is necessary to aggregate all outflows and inflows over the life of the project using the data in Table 1.

Total outflows	£1,815m
Total inflows	£3,400m
Net cash flow	£1,585m

This allows the net cash flow to be calculated. This is:

£3400m - £1815m = £1585m

This value can then be divided by the number of years of the project's projected life to get an annual rate of return:

$$\frac{£1585m}{9} = £176.1m$$

Finally this average value can be expressed as a percentage of the original investment:

$$\frac{£176.1m}{£150} \times 100 = 117.4\%$$

This is an extremely good rate of return. It is usual to compare this against the opportunity cost. This is the return that could be achieved by investing the £150m in another activity. For example, it might be considered more prudent to keep the money in the bank as cash reserves. However, bank interest rates are rarely more than 10%, far less than the 117% returns expected from this project.

GLOSSARY

Payback: Way of evaluating an investment by calculating the likely time taken to earn back the sum invested.

Break-even: The output level at which total revenue equals total cost. At this point, the business has made neither a profit or a loss.

Average rate of return: The average annual profit on an investment project expressed as a percentage of the original outlay.

There is one major drawback to an analysis based on annual average rates of returns. Unfortunately, ARR takes no account of the *timing* of cash flows. This matters as returns received sooner are less risky – the financial estimates become less certain over time. They are also worth more, since the profits can be reinvested to earn further returns.

Discounted cash flows

This problem is tackled using discounted cash flows. This is a method of determining what *future* cash inflows are actually worth today. This depends on the opportunity cost of money. One way of putting a value on the opportunity cost of money is to use interest rates. This is what could be earned by simply keeping the money in a bank account gaining interest.

Suppose interest rates for the next year are estimated to be 10% on average. Then, in a year's time an investment of £1 would be worth:

$$£1 \times \frac{110}{100} = £1.10$$

Put another way, £1.10 in a year's time is worth £1 today. A formula can similarly be applied to find out what any sum in the future would be worth today. Assuming opportunity costs of 10%, a £1 in one year's time is worth:

$$£1 \times \frac{100}{110} = £0.91$$

And £1.00 in two years' time is worth:

$$£1 \times \frac{100}{110} \times \frac{100}{110} = 1 \times \left(\frac{100}{110}\right)^2 = £0.83$$

This sequence can be extended for years into the future producing factors that can be used to convert future cash flows into their present values (PV). For example, with a discounting rate of 10%, the discount factor is 100/110 or 0.91 applied to the value of a sum received after one year; for two years it is $(100/110)^2$ or 0.83; for three years it is $(100/110)^3$ or 0.75. Table 2 shows factors for discount rates of 10% and 20%.

We can now look again at the Grangemouth expansion project and calculate the expected return on a discounted cash flow basis. Typically, a company such as Syngenta uses a discount rate that reflects the minimum return expected on capital employed. This is likely to be a good deal higher than average interest rates. Table 3 shows the discount cash flow for the Grangemouth project using a discount factor of 20%. Again this is illustrative data to show the basic principles of the method.

The present value of all the projected cash flows can be aggregated to give the net present value (NPV) for the whole project. In this illustrative example, the net present value is £569.1m. If this value is positive, then the project is expected to achieve earnings with a value greater than the opportunity cost of the funds committed.

Conclusion

On the basis of the investment appraisal, the Grangemouth expansion project was approved. The analysis suggested that it will earn well above the cost of capital and it will reach payback after less than two years. The new plant came on stream in 2010. It created 50 new jobs and Syngenta is now supplying Amistar to new customers in expanding markets.

QUESTIONS

1. Identify the key factors that might be driving Syngenta's R&D into crop protection systems.
2. Drawing on Figure 2, to what extent might Amistar enjoy a competitive advantage over rival products during the period of the proposed investment?
3. When might the payback period be a useful guide in making an investment decision? What are its limitations?
4. Using Table 1, assume that investment costs turn out to be 50% above these estimates and that sales (and costs) are 50% below these forecasts. How might this revised financial data affect Syngenta's investment decision?

Table 2: Discount rate factors for Syngenta's Grangemouth expansion project

Discount factor	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9
10%	1.00	0.91	0.83	0.75	0.68	0.62	0.56	0.51	0.47	0.42
20%	1.00	0.83	0.69	0.58	0.48	0.40	0.34	0.28	0.23	0.19

Table 3: Discounted cash flows for Syngenta's Grangemouth expansion project

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9
Net cash flow £m	(150)	80.0	185.0	210.0	210.0	210.0	210.0	210.0	210.0	210.0
Discount factor	1.00	0.83	0.69	0.58	0.48	0.40	0.34	0.28	0.23	0.19
DCF £m	(150)	66.4	127.7	121.8	100.8	84.0	71.4	58.8	48.3	39.9