

CHAPTER 8 - Strategic evaluation and choice

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CHAPTER 8 - Strategic evaluation and choice

8.1 Introduction

There is a range of strategic options available to an organization to fill a profit gap. A gap can arise due to a change in the environment or internal resources and capability. Each option needs to be evaluated in terms of strategic and financial impact. In practice, however, many organizations, particularly small and medium-sized organizations, will not have the resources to assess every single option in detail. A strategy is often about making small incremental changes to the original plan and evaluating the results. In some instances, it may be the case that the strategy is decided, and the numbers are crunched afterward to provide some comfort that it will work (Pitcher, 2015), and these may only be rough estimates.

This chapter reviews a simple framework for evaluating strategic options that look at the suitability (strategic fit with the SWOT), acceptability (to the stakeholders), feasibility (sufficient resources or access to resources), and risk. It can be remembered as the SAFeR framework. As part of the suitability, the chapter covers stakeholder analysis and the key accounting technique of investment appraisal via net present value calculations and real options. Finally, the chapter reviews the need for and the process of risk management. Organizations have been accused of not taking enough account of the risk involved when implementing strategic options. It was highlighted by CIMA in 2007, interestingly before the financial crisis of 2008/2009, in a report that introduced the CIMA scorecard (CIMA, 2007). The report suggested a framework consisting of a strategic position (SWOT), strategic options, strategic implementation, and strategic risk.

8.2 Learning outcomes

After studying this chapter, you will be able to:

- Understand and apply the SAFeR framework for strategic option evaluation
- Discuss the concept of stakeholder mapping and its significance in strategic options evaluation
- Understand and apply a net present value calculation to a given investment opportunity
- Discuss the use of real options in investment appraisal
- Discuss the need for and the process of risk management
- Critically evaluate the contribution that management accounting can make to the evaluation of strategic options

8.3 Elements of Strategic Evaluation

Active reading. Note how the evaluation of strategic options uses the analysis developed from the SWOT and how the financial evaluation is just part of the decision.

The evaluation of options involves strategic as well as a financial evaluation. A useful framework for evaluating strategic options was put forward by Johnson, Scholes, and Whittington (2007), in their book *Exploring Corporate Strategy*. Suitability, acceptability, and feasibility, it is possible to remember this as SAFe. If, however, the aspect of risk is highlighted and considered as a separate element, the mnemonic SAFeR can be used.

Suitability

Suitability relates to the strategic logic of the strategy. The strategy must fit the organization's operational circumstances and strategic capability. It is asking whether the strategy builds on the strengths, addresses the weaknesses, grasps the opportunities, and avoids or minimizes the threats. Does it close any profits gap, and is it financially viable?

Acceptability

Acceptability relates to the stakeholders, and, as a minimum, the strategy must be acceptable to the key players.

Feasibility

Feasibility asks whether the strategy can practically be implemented. Is enough financing available? Does the organization have, or can it acquire the correct resource capability?

Risk

Risk identifies the risk and prompts risk management strategies to manage risk to an acceptable level.

In this chapter of the learning resource, we focus on stakeholders, financial viability, and risk management.

8.4 Stakeholder analysis concerning strategic choices

Active reading. Note the range of stakeholders that can be considered and the use of stakeholder mapping to prioritize and determine a strategy to manage the stakeholder views. Also, think about how the presentation of financial forecasts and financial information could be used to influence stakeholder support for the strategy.



Video link [Stakeholders and stakeholder analysis](https://www.youtube.com/watch?v=k9-6Wlt84Ws)

[\[https://www.youtube.com/watch?v=k9-6Wlt84Ws\]](https://www.youtube.com/watch?v=k9-6Wlt84Ws)

When organizations implement strategies, there are many different groups of people who are affected. Therefore, organizations need to consider the potential impact that their decisions will have on various stakeholders. Definitions of stakeholders concerning organizations vary by the emphasis they place on the relationship. In broad terms, a stakeholder is any group or individual who is affected by or can affect the organization's activities (Freeman, 1984). Other authors, such as Clarkson (1995), stress that stakeholders can claim ownership rights or interests in an organization and its activities past, present, or future. These claimed rights or interests are the result of transactions with, or actions taken by, the organization. They may be legal or amoral, individual, or collective.

Bryson (2004) suggests that stakeholders are persons, groups, or organizations that must somehow be considered by leaders, managers, and front-line staff. There is broad agreement that stakeholders have an interest or a reliance on the organization and that organizations have a responsibility to their stakeholders. As sustainability is becoming more prominent, this leads to the conclusion that stakeholders would include future generations who are not yet born, as organizations need to consider the impact on the planet when making strategic decisions that may impact on sustainability.

Different stakeholder groups will have different interests and levels of influence concerning the organization and the decisions that it makes, which indicates why organizations need to assess stakeholder views about the strategy that is adopted. Organizations need to understand the criteria by which stakeholders will judge their performance against their expectations, and therefore what the organizations can do to satisfy those expectations. The degree of power and influence that various stakeholders can exercise, together with the legitimacy of the stakeholder relationship and the urgency of the claim, needs to be considered (Mitchell et al., 1997).

In practice, organizations cannot satisfy all stakeholders. Therefore, there needs to be a way of identifying and prioritizing those individuals or groups that are affected by or can affect an organization's ability to achieve its objectives (George, 2003). There will also be an element of a trade-off between competing aims. It may be a case of satisfying rather than maximizing stakeholders' needs and expectations.

8.4.1 Classifications of stakeholders

Stakeholders have varying degrees of interest and influence, depending on their relationship to the organization. One approach to deciding which stakeholders are relevant is to view their proximity to the organization in relation to the task or general environment, as illustrated in Figure 8.1. It determines the degree to which the organization relies on the stakeholder group for the successful implementation of its strategies.

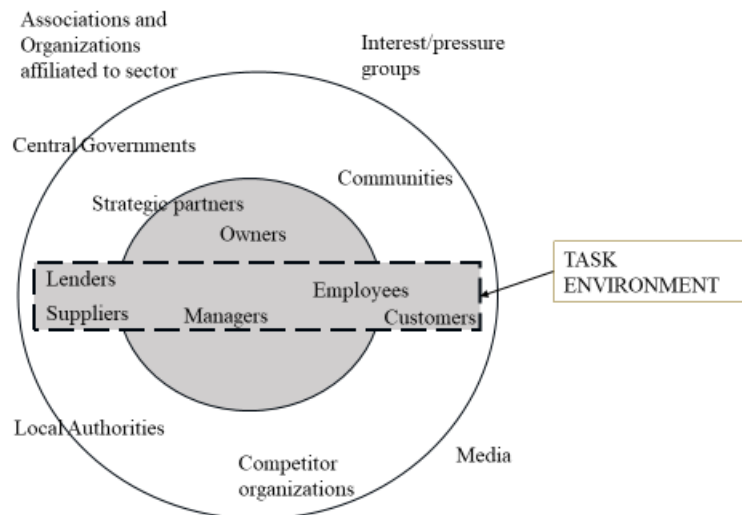


Figure 8.1 Stakeholders in relation to task and general environment

Another more simplified and potentially useful way of classifying stakeholders is using the mnemonic ICE, for internal, connected, and external

Internal

Typically, internal stakeholders are often thought of as employees being split between management and workers. However, employees can be broken down into many different groups who will have different interests, expectations, and degree of power or influence. Consider a hospital in which there are doctors, consultants, administrators, nursing staff, and porters. There may also be groups of workers who are contracted to another organization, such as caterers and cleaners. All groups could have a different view or reaction to a strategic decision taken by the organization, and some groups may be able to influence the success of the strategy more than others.

Connected

Connected stakeholders have a vested interest in the organization. This category will include shareholders and loan providers and sometimes suppliers and customers depending on the strength of the relationship with the organization.

External

External stakeholders might include the central government, the public, pressure groups, and the media.

Like most strategic analysis tools, stakeholder analysis is not a precise science. Mendelow (1991) suggested that stakeholders' views will differ depending on the strategic decision being made. Different dimensions need to be considered, such as whether power and influence are individual or collective. For example, an employee or customer may not have much power individually to change a decision, but collectively could exert a higher degree of power, often in the form of a trade union or consumer group. The impact that a stakeholder group may have could also be short term or long term.

It is possible to determine that there will be conflicts arising between stakeholder groups. For example, closing a manufacturing unit will not be acceptable to employees. If, however, it is increasing profitability via cost reduction and increased efficiency in other units, shareholders may well support the decision. The relative power positions of stakeholder groups can be determined by the degree of dependency an organization has on a stakeholder group at any time. For example, an organization that is experiencing severe cash flow problems may be dependent on its bankers to provide it with finance, which puts the bank in a strong position to influence strategy. In some cases, the bank may demand a seat on the senior management team to protect its position.

The degree of reliance can be analyzed by understanding the degree of disruption, ease of replacement, and degree of uncertainty that a stakeholder group can create (Mintzberg, 1999). As an example, the London underground train system has a strong driver's union, and disputes frequently arise between the union and the management team. The union is in a strong position as a stakeholder as they can disrupt the organization's plans by calling the drivers out on strike, that is, withdrawing their labor. Due to the labor protection laws in the United Kingdom, it is difficult to replace employees, certainly in the short term. The union went through a long-running dispute by threatening to go on strike, and then calling it off at the last minute. This action creates a high level of uncertainty for the thousands of people who use the underground train system to get to work, creating uncertainty in many organizations operating in London. These three factors put the union in a strong position with a high degree of power and influence over the decisions, requiring a participative approach to management by the organization in dealing with the stakeholder group.

8.4.2 Stakeholder Mapping

The technique of stakeholder mapping can be used to understand the dynamics of the stakeholder influence on a strategic decision being considered. A typical matrix showing the degree of influence and power on one axis against the expectations or level of interest on the other axis can be used, as shown in Figure 8.2.

		Degree of power and influence	
		High	Low
Level of interest/ expectations	High	These can aid or hinder the implementation of a strategy and need to be involved in the decision making process. They can become the key players in the decision.	These need to be kept informed about the strategic decision, its benefits and impacts, as their cooperation is required to implement the strategy successfully.
	Low	These need to be kept satisfied and in some cases an intervention strategy may be required to convince them that the decision is in their interests. These can become key players if their interest level increases.	These need to be monitored in case they become interested or increase their power base, but essentially they can be directed as to what the strategy is and managed accordingly.

Figure 8.2 Stakeholder mapping

Stakeholders with a high degree of power and a high degree of interest can be described as key players: strategy must be acceptable to them, at least. These stakeholders can exert considerable influence on the strategic decision under consideration, for example, a significant provider of capital such as a bank, or a local authority from whom planning permission is required to develop the land. It can extend to powerful suppliers or customers where they hold a high degree of power in negotiations.

It is the key players that an organization needs to identify when formulating strategy. However, it is essential to realize that stakeholders can move from one quadrant to another depending on the situation under review and must, therefore, be managed appropriately, as indicated in Figure 8.2. Although the analysis can be undertaken as a general exercise, it is best deployed as a way of understanding the key players in relation to a strategic decision.

8.4.3 The Case of Dyson’s Decision to Move Production Overseas

Dyson is a U.K.—based company that became famous for developing new technology for vacuum cleaners. Soon other products were added to the portfolio. In 2002, the multimillionaire and inventor James Dyson, the owner and then sole shareholder, decided to move production of his bagless vacuum cleaners to the Far East with the loss of 800 jobs in the U.K. The decision was also part of the strategy to launch products in the U.S. market. Countries such as Malaysia were closer to the U.S. market, and the move would not only reduce production costs by 30 percent but also release additional cash that could be used to fund the marketing campaign.

James Dyson had been critical of the U.K. government for not doing enough to support manufacturing, and not surprisingly, the U.K. government expressed their disappointment at the move. The trade union was also very vocal in their condemnation of the move but could do

little to stop the decision. Mapping the stakeholders affected by the decision, as shown in Figure 8.3, illustrates why James Dyson was able to make the decision unopposed as there were no stakeholders with enough power and influence to affect the decision-making process.

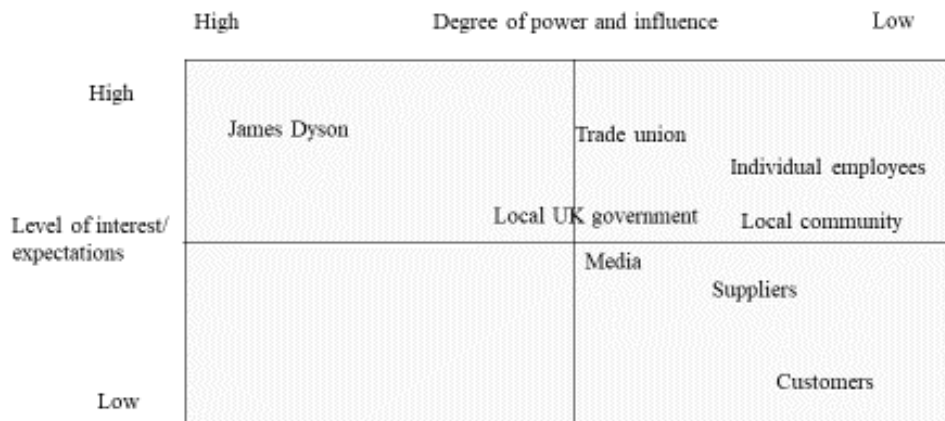


Figure 8.3 Stakeholders affected by the Dyson decision to move production overseas

Learning activity. As the covid-19 pandemic has affected many people in different ways, there is a growing need for help from volunteers and charities. The crisis has, however, also meant that many people are suffering financially, and charities have seen a drop in donations. Some governments are even talking about reducing the amount of financial aid given to international organizations for charitable enterprises.

Imagine that you are a senior manager with an international aid organization that provides humanitarian and development aid to children worldwide, receives approximately 60% of its funding from government grants, 10% from corporate donors and the rest from private donors. The organization has learned that government grants are likely to be reduced or not renewed next year. The organization has some permanent employees but relies mainly on volunteers at a local level.

The senior management team recognizes that it may need to reduce the amount of aid it can provide during the next few years if it is unable to attract the usual levels of funding. Undertake a stakeholder analysis to reflect the level of interest and degree of power of stakeholders related to this decision.

8.5 Financial Evaluation

Active reading. Note the different methods of financial evaluation that can be used and why the net present value calculation might be the preferred method. Remember that decisions should not be taken based on the numbers only. Think about the reasons why financial analysis does not provide the answer.

The accountant has a pivotal role to play in the evaluation of capital investment and strategic decisions that required significant amounts of investment over a period. The term capital investment appraisal is also often referred to as capital budgeting, as the organization may not be able to undertake every investment opportunity due to the limited availability of capital resources at its disposal. The investment appraisal process, therefore, provides a basis for evaluating those investments that will enable the organization to close any gap that arises from the GAP analysis discussed in Chapter 5, section 5.4.

It is important to note that strategic decisions should not be based solely on the numerical evaluation but also take account of strategic factors of a nonfinancial nature. There may be circumstances in which it makes sense strategically to undertake a decision that provides benefits other than financial, for example, developing a presence in a geographic market that eventually opens access to other markets. Considering strategic and financial factors has implications for being sure of the long-run benefits of the strategic decision being made and the time frame in which those benefits might be realized. For example, establishing a business in Bangladesh can open markets in countries such as Northeast India, Nepal, and Bhutan, due to the strategic importance of their seaports. It may be more appropriate to evaluate the cost of setting up in Bangladesh as a separate exercise. The future cash flows emanating from access to other markets may be too far in the future to be able to estimate with any meaningful accuracy, even though this may be the real intention behind the strategy.

The long-run impact of strategic decisions raises another critical issue in that some strategies, such as the instance of Bangladesh, can be broken down into phases, and at specific points in the future, different decisions can be made. The decision to operate in Bangladesh can be part of the cost of a much broader strategy. The example also serves to indicate that an investment appraisal of a strategic option is not just undertaken once, but should be repeated at significant milestones to see if it is still worth continuing given the changes in the environment. There are, therefore, exit points or decision points at which the initial decision can be reassessed considering new and more up-to-date information.

8.5.1 Methods of Investment Appraisal

Payback Period

A typical investment appraisal technique is known as the payback period. In its purest form, this is answering the question, how long does it take to recoup the initial investment? Everyone quickly understands the technique, and the basic principle states that the investment with the

shortest payback period is the preferred option. However, there are some drawbacks to this method, as illustrated in Table 8.1.

Table 8.1 Simple payback period calculation

Years	Project A \$	Project B \$
0	(1,000)	(1,000)
1	900	100
2	100	900

The immediate difficulty is that both project A and project B payback in 2 years. However, the instinct suggests that project A would be preferred over project B, as more of the investment is recouped in year 1. This conclusion is instinctively considering two factors. Firstly, the time value of money, that is, given a choice people would prefer to receive the money earlier rather than later as they perceive that the buying power of cash now is more than in the future, owing to inflation and the chance of earning interest. And secondly, the risk involved in that early cash flows represent less risk than future cash flows. In its crudest form, the payback method ignores future cash flows received after the payback period.

Net Present Value (NPV) Calculation

The net present value (NPV) technique takes account of the time value of money by applying a discount factor to all future cash flows (capital costs and all revenues and expenses) that convert the nominal cash flows into present-day values. It is worth noting that discounted cash flows can be used within the payback method described above to account for the time value of money. It would then be called a discounted payback period.

NPV raises the issue of what to use as the discount factor. The organization's weighted average cost of capital (WACC) is typically used as the discount factor, and this can be adjusted to take account of risk and the effect of future financing requirements. Using a discount factor to convert cash flows to present-day values enables a comparison of different investment options that have different timings of cash flow as all cash flows are represented in equivalent values.

The standard rule is that a project providing a positive NPV would be acceptable in financial terms, and one with a negative NPV would not be acceptable. In the case where there are alternatives, the one with the highest positive NPV would be preferred. It is important to reiterate that strategic decisions should not be made purely based on the financial evaluation. The example in Table 8.2 illustrates this for three projects, each of which would require an initial investment of \$50,000. Each project provides a different profile of net cash flows over the life of the project.

Table 8.2 NPV for three alternative projects

Year	Project A	Project B	Project C	Discount factor (10%)	Project A	Project B	Project C
	Nominal cash flows \$,000				Discounted cash flows \$,000		
0	(50)	(50)	(50)	1.0	(50)	(50)	(50)
1	28	0	40	0.91	25	0	36
2	22	30	8	0.83	18	25	7
3	8	30	12	0.75	6	22	9
4	4	0	14	0.68	3	0	9
5	0	21	1	0.62	0	13	1
	12	31	25		2	10	12

When looking at the nominal cash flow on the left, project B may be preferred as it provides a higher net benefit over the life of the project. However, when the timing of the cash flow is considered by applying the discount factor, which converts all cash flows into present-day values, project C produces a higher NPV. It is quite close to project B, so a final decision will also need to consider the nonfinancial factors.

The NPV analysis can be enhanced and made more sophisticated, for example, by applying probability values to future cash flows creating an expected value. Another variation might be inflating costs by an expected rate of inflation, but increasing sales by the predicted growth in sales value based on volumes and pricing strategy.

The discount factor can be adjusted for various situations. For example, it could be increased over the cost of capital to include a risk factor, and within this, different discount rates can be applied to revenues and costs. It may be that costs can be estimated with a higher degree of certainty than revenue cash flows. This degree of uncertainty can be accommodated by using different discount factors for different items. For example, future rental costs may be known with some degree of certainty, but raw material costs could be extremely volatile. Sensitivity analysis can also be applied to model different scenarios.

The process of the net present value calculation is to establish the cash inflows and outflows for a project and then to determine the discount factor to use, which, as already mentioned, is usually the weighted average cost of capital of the organization. The weighted average cost of capital is outside the scope of this learning resource, but as a simple example, suppose an organization has the capital structure shown in Table 8.3.

Table 8.3 Simple capital structure consisting of equity and debt

	\$	
Equity: Share capital / common stock	60,000	60%
Loan stock at 5% interest per annum	40,000	40%
Total capital	100,000	100%

If shareholders expect a return of 8%, the weighted average cost of capital would be as shown in Table 8.4.

Table 8.4 Calculation of WACC

Equity – share capital	60% x 8%	4.8%
Loan capital	40% x 5%	2.0%
Weighted average cost of capital		6.8%

Many organizations will have a more sophisticated capital structure than illustrated here, but the principle of the calculation still applies.

It should be noted that there are alternative methods to estimate the cost of equity capital. A detailed explanation of these is more suited to learning resources related to corporate finance. In practice, an estimated cost of capital is often used. In situations where funding is limited, a higher cost of capital may be set as a hurdle rate that investments must reach before they are considered further. The hurdle rate is a technique commonly used in capital rationing, where there are many potential projects, but limited finance is available.

Example NPV calculation.

Chuck Sandecker left College wondering what to do with his life. He had been on a football scholarship and had enjoyed a successful college football career but had missed out on playing professionally in the NFL. However, having majored in sports science, he did know how to keep fit, and his girlfriend, Maria Esparido, had majored in business and economics. Pooling their expertise, they had decided to set up their own gym in their hometown of Gulf Shores in Alabama. The town has a population of just over 10,000 people and is famous for music festivals. It also borders the Gulf State Park, which is said to be the best in Alabama. The fitness center, which they named My-Kind-of-Gym, and branded **MKGym**, was extraordinarily successful, and on the back of their success, Chuck and Maria were investigating opening an outdoor activity center with accommodation near the Gulf State Park.

Chuck and Maria have prepared a forecast of the cost and potential cash flows of building and operating the accommodation at the **MKGym** outdoor center.

They estimate that it will cost \$300,000 to create a timber-framed building that could include 15 large double rooms with en suite bathrooms and ten family rooms (also with en suite bathrooms) capable of sleeping four people. The building could be established very quickly and would be built by a local company that specializes in this type of construction.

The cost of furnishing a total of 25 rooms and bathroom suites would cost an additional \$125,000.

The initial target for customers is to achieve an average occupancy rate of 50% in the first year, rising by 20% each year until a 100% occupancy rate is reached. The center would be open 365 days in the year, so 50% represents (25 rooms x 365 days x 50% = 4,562 rooms days in the first year). For planning purposes, it is assumed that all rooms will be charged at the

same rate of \$50 per day. At the moment, it is anticipated that this will be competitive, and Chuck suggests that they keep the same price for the foreseeable future.

The operating costs, such as energy and maintenance of the building, are expected to be \$200,000 per annum. This cost will rise each year by the rate of inflation, which is currently 3% per annum.

A manager will be recruited to manage the building and make sure that accommodation and general site is maintained to a high standard. A salary of \$35,000 per annum will be paid. For planning purposes, assume that this remains the same each year. One of the staff currently employed at the town gym is interested in the position. They are currently paid \$25,000 per annum. Chuck is keen to promote from within the company, so it is highly likely that the employee will be transferred to the outdoor gym and paid at the higher salary. Chuck will not recruit a replacement at the town gym. [Note that in investment appraisal calculations, only the additional relevant cash flows are considered. In this case, as the employee is already employed, the only extra cost is the increase in salary of \$10,000].

Cleaning will be done by a contract cleaning company that specializes in hotel cleaning and charge based on the number of rooms cleaned. For planning purposes, the cost can be calculated as 2% of the revenue earned from renting out the rooms.

Chuck is also anticipating that they can make extra money by renting out mountain bikes. He plans to invest \$20,000 immediately to buy a range of mountain bikes of varying sizes. Chuck is then planning to increase the number of bikes each year by spending a further \$4,000 in each of years 2, 3, 4, and 5. He estimates that the revenue generated in each year from hiring out these bikes will amount to 1.5 times the total accumulated cost of the investment in each year.

Assume the cost of capital is 10%, which includes a risk element. **MKGym** usually uses five years over which to evaluate capital investment projects.

Ignore taxation.

Calculation of anticipated room occupancy.

Total capacity is 25 rooms on 365 days in the year = 9,125. [Note that it could be deemed unrealistic to assume 100% all year round, but as a target, it enables a model to be established on which sensitivity analysis can be conducted.]

The number of rooms occupied each year each shown in Table 8.5.

Table 8.5 Calculation of room occupancy

Year	1	2	3	4	5
Number of rooms	4,562	5,474	6,569	7,883	9,125
Price \$	50	50	50	50	50
Revenue \$	228,100	273,720	328,464	394,156	456,250

The net present value calculation is shown in Table 8.6. Note that we use the year zero to account for costs that are incurred immediately. The normal convention in NPV calculations is to assume that all revenues and costs occur at the end of the year.

Table 8.6 NPV calculation for the expansion project

Year	0	1	2	3	4	5
Description	\$000	\$000	\$000	\$000	\$000	\$000
Cost of building	(300)					
Furnishing	(125)					
Revenue from rooms		228	274	328	394	456
Operating costs		(200)	(206)	(212)	(218)	(225)
Manager - increase		(10)	(10)	(10)	(10)	(10)
Cleaning		(5)	(5)	(7)	(8)	(9)
Purchase of mountain bikes	(20)		(4)	(4)	(4)	(4)
Revenue from the initial investment in bike hire		30	30	30	30	30
Revenue from additional bikes			6	12	18	24
Net cash flow	(445)	43	85	137	202	262
Discount factor 10%	1.00	0.91	0.83	0.75	0.68	0.62
Discounted cash flow	(445)	39	70	103	138	163
NPV						68

Note: The discount factors can be calculated using the formula $PV = 1/(1+r)^n$ where r = interest rate (cost of capital), n = number of periods. There are also present value calculators freely available on the Internet or present value tables (see Appendix D) where the discount factors can be easily obtained.

Internal Rate of Return (IRR)

An internal rate of return can also be calculated as a means of making comparisons. It is the equivalent of the discount factor that is required to achieve an NPV of zero. It can be calculated by trial and error using an NPV calculation with different discount factors until the NPV is zero. The following formula shows what you are looking for.

$$NPV = \sum_{n=0}^n \frac{C_n}{(1+r)^n} = 0$$

Where: C = cash flows; n = number of years; r = cost of capital (in decimals)

There is an NPV function and IRR function in Excel that can be used to calculate the IRR.

Alternatively, it can be calculated via interpolation, or ascertained using a graphical method shown in Figure 8.4. The method of interpolation uses a low discount rate to calculate a positive NPV and a high discount rate to calculate a negative NPV.

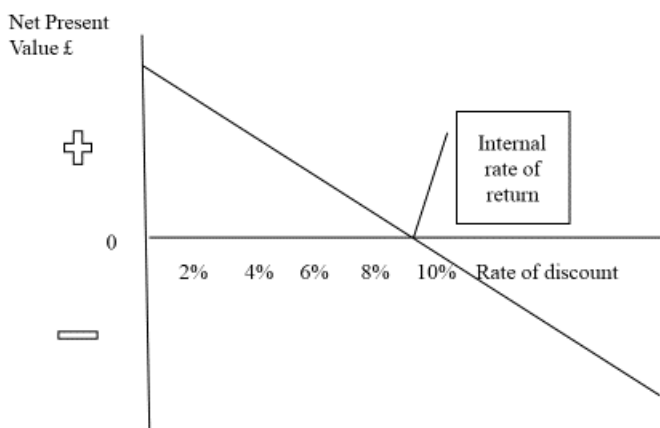
The result can be read from a graph, shown in Figure 8.4 where the IRR is approximately 9.5%. Or the following formula can be used.

$$IRR \approx a + \left\{ \left(\frac{NPVa}{NPVa - NPVb} \right) (b - a) \right\} \%$$

Where

- a: is the lower of the two rates of return used in the calculation that produces a positive net present value.
- b: is the higher of the two rates of return used in the calculation that produces a negative net present value.
- NPVa : is the positive net present value as the result of using lower rate of return a.
- NPVb: is the negative net present value as the result of using higher rate of return b.

Graphical method



35

Figure 8.4 Internal Rate of Return

The IRR can be useful as organizations may set a high hurdle rate of return, which projects must achieve before they are accepted. Managers, therefore, readily understand that if a hurdle rate of 15 percent is set, the IRR must be above the target.

Accounting Rate of Return and Profitability Index

Other methods that could be used include the accounting rate of return in which the profit that can be earned is compared to the initial investment, or an average investment, to create a measure based on profitability.

$$\frac{\textit{Profit on investment}}{\textit{Average investment}} \times 100 = \% \textit{return}$$

A profitability index can be created, which compares different projects based on a calculation of the value per unit of investment.

$$\frac{\textit{Present value of future cash flows}}{\textit{Initial investment}} = \textit{profitability index}$$

Learning activity.

Yelena Petrov and Vladimir Boshirov had moved from Russia to Salisbury in the U.K. in 2010. Yelena and Vladimir were both passionate about healthy eating. They had picked up on a growing trend for freshly made fruit drinks, particularly among the millennial generation, who were becoming more concerned with how they look and the benefits of a healthy lifestyle. Having settled into the local community and noting the tourist trade and the growing younger population of Salisbury, they began their first business venture in 2011, which was a small bar selling freshly made fruit juices from organic produce. The venture was called the Fruit Bat Bar. The business was hard work in the first year, but they managed to make a small profit. Within a few years, they had opened another four outlets in the region.

An interesting opportunity

Nisa stores, which are independently owned local convenience stores trading throughout the U.K., have recently expressed an interest in stocking a range of Fruit Bat juices.

The plan would be for them to stock the Fruit Bat products in their stores in the local area around Wiltshire, which is where Salisbury is located, and if successful, to broaden the sales to more regions. Vladimir thinks that if they agree to work with Nisa stores, they will need to set up a dedicated unit to service the demand from the stores. It would entail finding suitable premises and staffing them accordingly.

Vladimir is considering the opportunity from Nisa to provide their stores with Fruit Bat Bar products.

Nisa has proposed that they will sell them under the Fruit Bat Bar Limited brand. They are considering launching the products in the local region currently served by the Fruit Bat Bar outlets as this is where the brand is known, but eventually, assuming that it is successful, they

will make it available to all of their stores. The Nisa stores are typically convenience stores located within the local community.

To satisfy the requirement, Vladimir estimates they will need to secure separate premises to produce the products required. Vladimir has found premises in Salisbury that would be suitable. There is a current space available that could be rented at an annual cost of £100,000. The unit also has additional space that could be rented in one year's time. Vladimir thinks that this would allow for expansion if Nisa decided to offer the product more widely after the first year. The extra space would be at an additional cost of £50,000 per annum commencing in year 2.

Vladimir will need to buy immediately the equipment necessary for juicing and packaging the product costing £25,000. In year 2, he would need to purchase additional equipment totaling £50,000. Assume that these have no value at the end of 5 years.

He would require 2 unskilled workers at the cost of £8 per hour for a 35 hour week, in the first year. He would manage the operations himself during the first year. Assuming the expansion goes ahead in year 2, he would need an additional 2 workers on the same pay as the initial workers but would recruit a manager on an annual salary of £25,000.

Administration and general operating costs in the first year associated with the new operation would be £75,000, rising to £90,000 per annum in the second year of operations.

Nisa wishes to trial the product initially in 5 stores local to Salisbury. They believe that they will be able to sell 2,000 units per week in each of their 5 stores for £3.60 each. They will take a margin of 60%, i.e., they pay Fruit Bat Bar 40% of the sales price.

Nisa will then roll out the product into the other 15 stores in the region in year 2. They believe that they will be able to sell 2,000 units per week in each of these stores as well.

The material cost for each unit produced is £1.20.

Vladimir usually undertakes investment evaluation over 5 years using an estimated cost of capital of 10% as the discount rate.

Ignore taxation.

Required:

Using NPV as a method of investment appraisal, recommend whether Vladimir and Yelena should go ahead with the opportunity to supply Nisa with juice products. Assume that the project extends for five years.

A solution to the learning activity

Investment appraisal						
Description	0	1	2	3	4	5
Rental		(100,000)	(100,000)	(100,000)	(100,000)	(100,000)
Additional space rental			(50,000)	(50,000)	(50,000)	(50,000)
Equipment	(25,000)		(50,000)			
Workers		(29,120)	(29,120)	(29,120)	(29,120)	(29,120)
Additional workers			(29,120)	(29,120)	(29,120)	(29,120)
Manager			(25,000)	(25,000)	(25,000)	(25,000)
Operational costs		(75,000)	(90,000)	(90,000)	(90,000)	(90,000)
Sales by Nisa stores		1,872,000	1,872,000	1,872,000	1,872,000	1,872,000
Additional sales			5,616,000	5,616,000	5,616,000	5,616,000
Margin taken by Nisa		(1,123,200)	(4,492,800)	(4,492,800)	(4,492,800)	(4,492,800)
Cost of materials		(624,000)	(2,496,000)	(2,496,000)	(2,496,000)	(2,496,000)
Net cash flows	(25,000)	(79,320)	125,960	175,960	175,960	175,960
discount factor 10%	1	0.909	0.826	0.751	0.683	0.621
Discounted cash flow	(25,000)	(72,102)	104,043	132,146	120,181	109,271
NPV						368,539

8.6 Real Options

Active reading. Note how the real options approach uses the net present value concept. As with other methods, the numbers only provide part of the information required to decide the best course of action. Also, remember that many factors come into play when estimating future cash flows, and therefore the use of sensitivity analysis is recommended.

An approach that is becoming more popular is known as real options analysis. This method recognizes that organizations often have multiple options available related to a strategic decision. For example, concerning the case of the Bangladesh project discussed in Chapter 7 and HW Inc. activity 13, there are several options. The management team could decide to delay the project or adopt a graduated phased approach. For example, they could begin by exporting, then later establishing a local sales office, followed by creating local production facilities, and finally setting up a local subsidiary company, or; abandon at any stage, or entirely. Using this approach entails evaluating the various options. It makes management aware of the financial implications of implementing the different options that can be considered in the decision-making process. The real options are treated similarly to financial market options in that they create a right, rather than an obligation, to act.

8.6.1 The concept of options and real options in investment appraisal

A net present value (NPV) calculation within an investment appraisal evaluation assumes typically that a project commences immediately and proceeds until it finishes. It is treating the investment as a one-off decision. Many investment decisions, however, are flexible, and managers are faced with several possible actions that could be taken. NPV calculations also largely ignore the strategic value of the projects, such as the opportunity to expand into a new market, or develop natural resources such as shale gas, oil, gold, and other minerals, or exploit new technology, or agree to acquire or merge with another company.

Risks and uncertainties can be dealt with in NPV evaluations by adjusting the cost of capital, attaching probabilities to outcomes, or conducting sensitivity analysis (which is always recommended). This section reviews the basic concept of evaluating options within investment decisions. Firstly, by introducing the concept of options via a simple example. Then moving on to look at how an option is valued to aid decision making, and finally, it looks at the use of the Black-Scholes option pricing model to attach a fair value to an option within an investment decision.

8.6.2 Different types of options

Option to delay/defer

In business decisions, there are frequently options to delay/defer without losing the opportunity. For example, should the organization begin mining silver now or wait until the price goes up. Or wait until market conditions are more favorable before opening a new store. Or wait until the political environment is known with more certainty, for example, it may make sense to delay when an election is on the horizon, or new legislation is being debated, and the outcome is uncertain.

Options to switch/redeploy assets

If market conditions change, there may be options to switch/redeploy assets. For example, investing in a flexible manufacturing system that is capable of producing more than one product without any additional switching cost. Or changing the use of a building, such as an option for a college to turn office space into extra teaching space should the capacity be required.

Options to expand/contract operations

When market conditions are good, there may be options to expand, or when bad, options to contract. For example, designing projects in an easily scalable way may cost more upfront but saves money later. Similarly, construction projects such as a sports stadium could be designed to incorporate a single-tier stand with much stronger foundations than initially required. If the team (or venue) was successful and needed additional space to accommodate increased attendance in the future, a second-tier could easily be added without having to alter the

foundations. These are sometimes described as follow-on projects where additional investment is made if phase one is successful. As in the example of the sports stadium, projects such as this often require more expenditure in phase 1 than would be necessary if there was no follow-on option. Thus, there is a cost to building flexibility into a project. This extra cost is akin to a premium paid for a financial option, as will be explained in section 8.6.4.

Options to abandon/exit

The nature of the project may be such that there are options to abandon/exit the project at various stages during its lifetime. For example, a phased project to expand the market into overseas locations by first establishing an export facility, then later establishing overseas sales offices in key locations, then adding production facilities in key markets, provides opportunities to abandon part or all of the project at various stages within its lifetime. Similarly, projects that involve equipment or facilities that would have a resale value at various points within a project lend themselves to reviewing an abandonment option.

Situations where the concept of options is useful

Viewing options within investment decisions are generally useful in situations where there is:

- *Flexibility*: the ability to change the business route over time.
- *Uncertainty*: the value of a project cannot be fully predicted.
- *Irreversibility*: most decisions have no turning back, and as a result, imply sunk costs.

8.6.3 Viewing options as real options

An option definition when referring to financial options gives the holder the right, but not the obligation, to buy or sell an underlying asset, such as a stock or share. The option helps to place a value on the flexibility in the decision. For example, a call option (the right to buy in the future) on a share or stock allows an investor to wait and see what happens to the price of a share before deciding whether to exercise the option. It is possible for the price of the option, known as the premium, to benefit from favorable movements without being affected by adverse movements in the price of the underlying asset (the share). Real options, however, refer to the choices or opportunities that a business may or may not take advantage of, or realize. Real options involve decisions that managers make that involve tangible assets. As with financial options, real options can involve spending some money upfront (like the premium paid for a financial option) which provides the flexibility later.

The concept of real options provides a means of placing a value on the flexibility that is present in many real investment decisions. As with any numerical technique, it does not give the definitive answer to an investment decision but provides managers with some additional information that facilitates a more informed decision.

The following examples provide some simple illustrations of how the concept of real options can be used in different types of investment decisions. We begin by using NPV calculations.

Option to wait (example 1)

Suppose a company has the opportunity to launch a new product. The initial investment in machinery to produce the product will cost \$27,500. There is, however, some uncertainty over the demand conditions for this year due to the impact of a virus that is potentially spreading around the globe and could reduce demand.

If demand for the product proves to be unaffected, the net cash inflow could be \$10,000 per annum, but if the outbreak adversely affects demand, the net cash inflow may only reach \$5,000 per annum. The marketing department suggests that there is a 50% chance of the demand being affected.

The concept of probabilities can be used to calculate the likely cash inflow.

$$(\$10,000 \times 50\%) + (\$5,000 \times 50\%) = \$7,500$$

The resultant net present value calculation is shown in Table 8.7, assuming a cost of capital of 10% and a time horizon of 5 years.

Table 8.7 – Net present value calculation

Year	0	1	2	3	4	5
	\$	\$	\$	\$	\$	\$
Initial investment	(27,500)					
Cash flow		7,500	7,500	7,500	7,500	7,500
Net cash flow	(27,500)	7,500	7,500	7,500	7,500	7,500
Discount factor (10%)	1.000	0.909	0.826	0.751	0.683	0.621
Discounted Cash Flow	(27,500)	6,818	6,195	5,633	5,123	4,658
Net Present Value						925

This option provides a positive present value, but it is relatively low.

However, the product development team does not believe that any of the competitors are in a position to launch a similar product and steal the market. They suggest that it would be a possible to wait and launch the product next year once the potential demand is more certain.

Another NPV calculation can be undertaken to illustrate what might happen if the company waited and launched the product next year. As with the normal convention, it is assumed that all cash flows occur at the end of the year. The best-case scenario is shown in Table 8.8, and the worst-case scenario is shown in Table 8.9.

Table 8.8 – Best-case scenario delaying by one year

Year	0	1	2	3	4	5	6
	\$	\$	\$	\$	\$	\$	\$
Investment		(27,500)					
Cash flow			10,000	10,000	10,000	10,000	10,000
Net cash flow	0	(27,500)	10,000	10,000	10,000	10,000	10,000
Discount factor (10%)	1.000	0.909	0.826	0.751	0.683	0.621	0.564
Discounted Cash Flow	0	(24,998)	8,260	7,510	6,830	6,210	5,640
Net Present Value							9,453
Expected value 50% probability							4,726

The calculation provides a more significant positive NPV than going ahead immediately and facing a higher degree of uncertainty.

Table 8.9 – Worst-case scenario delaying by one year

NPV calculation	0	1	2	3	4	5	6
	\$	\$	\$	\$	\$	\$	\$
Initial investment		(27,500)					
Cash flow			5,000	5,000	5,000	5,000	5,000
Net cash flow	0	(27,500)	5,000	5,000	5,000	5,000	5,000
Discount factor (10%)	1.000	0.909	0.826	0.751	0.683	0.621	0.564
Discounted Cash Flow	0	(24,998)	4,130	3,755	3,415	3,105	2,820
Net Present Value							(7,773)
Expected value 50% probability							(3,886)

The calculation returns a negative NPV.

It can be seen from this basic analysis that there is a benefit with the option to wait and see what the demand conditions are like in one year. If demand is high, the company will launch the product, but if demand is low, the decision not to begin would be more appropriate. The example illustrates that waiting until there is more certainty about the likely market would benefit the organization, either potentially making a higher gain, or avoiding a potential loss. The analysis of the option to delay gives management more information on which to base a decision.

Option to abandon (example 1)

The same basic approach can be used to evaluate an option to abandon.

Assume that the company launched the product but, at the end of the first year, has the option to abandon the project and sell the plant and equipment for \$22,500. This option to abandon can be treated as a separate decision, as the initial cost and the first year of trading are effectively sunk costs. The concept of the opportunity cost can be used to determine that the lost future cash inflows constitute the cost of abandoning the product. The best-case scenario is shown in Table 8.10, and the worst-case scenario is shown in Table 8.11.

Table 8.10 – Best-case scenario – good trading conditions

Year	0	1	2	3	4	5
	\$	\$	\$	\$	\$	\$
Cash flow (Lost income)			(10,000)	(10,000)	(10,000)	(10,000)
Sale of plant and machinery		22,500				
Net cash flow	0	22,500	(10,000)	(10,000)	(10,000)	(10,000)
Discount factor (10%)	1.000	0.909	0.826	0.751	0.683	0.621
Discounted Cash Flow	0	20,453	(8,260)	(7,510)	(6,830)	(6,210)
Net Present Value						(8,358)
Expected value 50% probability						(4,179)

Table 8.11 – Worst-case scenario – adverse trading conditions

Year	0	1	2	3	4	5
	\$	\$	\$	\$	\$	\$
Cash flow (Lost income)			(5,000)	(5,000)	(5,000)	(5,000)
Sale of plant and machinery		22,500				
Net cash flow	0	22,500	(5,000)	(5,000)	(5,000)	(5,000)
Discount factor (10%)	1.000	0.909	0.826	0.751	0.683	0.621
Discounted Cash Flow	0	20,453	(4,130)	(3,755)	(3,415)	(3,105)
Net Present Value						6,048
Expected value 50% probability						3,024

It may not seem that surprising, but this example illustrates that if demand turns out to be good, then it is better to continue with the project. Abandoning the project produces a negative net present value, and therefore would not be accepted. If demand proves to be poor, then it is better to abandon the project as the net present value of the option is positive.

These examples only use the net present value concept to evaluate each option or decision. The following examples are slightly more complicated but use the same principle as they look

at how the concept of financial options and, later the Black-Scholes option pricing model can be used to place a 'fair value' on an option.

Option to wait (example 2)

Assume that a company has a choice of investing in a new facility this year, wait until next year, or not at all. The plant and equipment can only be used for this investment, and once the decision is made, it cannot be reversed.

The cost of the plant and equipment is \$50m, and the net cash flows arising from the investment are estimated with some degree of certainty at \$75M. The cash flows for the next year, however, are less certain, and if trading conditions are favorable net cash flow generated could be \$100m, but if conditions are bad net cash flow could be \$50M. The marketing department predicts that there is a 66.66% chance of good conditions and a 33.34% chance of poor conditions.

In this example, we are ignoring the on-going situation in future years, and focusing on the initial decision of when to invest.

The case of investing this year is shown in Table 8.12.

Table 8.12 Invest this year

Year	0	1
	\$m	\$m
Investment now cash flow	(50)	75
Discount factor (10%)	1	0.909
Discounted Cash Flow (DCF)	(50)	68.175
Net Present Value (NPV)		18.175

If the investment is made next year, it provides the following net present values shown in Tables 8.13 and 8.14.

Table 8.13 - Good conditions

Year	0	1	2
	\$m	\$m	\$m
Investment next year –			
Good year cash flow		(50)	100
Discount factor (10%)	1	0.909	0.826
DCF		(45.45)	82.6
NPV			37.15

Table 8.14 - Bad conditions

Year	0	1	2
	\$m	\$m	\$m
Investment next year - Bad year cash flow		(50)	50
Discount factor (10%)	1	0.909	0.826
DCF		(45.45)	41.3
NPV			(4.15)

These calculations show that investing next year if conditions are favorable provides a higher NPV than investing this year, and if conditions are adverse, the company will not invest.

Taking the expected value of the good scenario 66.66% of \$37.15m = \$24.76m and deducting the NPV from investing this year of \$18.157m, the option to wait has a value of \$6.603m.

This result is by no means precise, but it provides the management team with more information on which to base a decision. If the decision is made to invest without this knowledge, there is a 33% chance that management finds themselves in a situation with reduced net cash flows and regretting having made the decision to invest. With this knowledge, management has a better idea of the value of waiting and having the benefit of additional information on the likely trading conditions.

Option to wait/abandon phase 2 (example 3)

Supermarkets often have a similar dilemma when entering a new market. Assume that a supermarket is planning to enter a new market, and the operations team and marketing team have combined to identify the following information.

Open 1 store, 2 stores, or not invest

Table 8.15 Expected cash flow under demand conditions

	\$m		\$m
Cash flow if high demand	14	50%	7
Cash flow if low demand	8	50%	4
Expected value of cash inflow			11
Investment per store	(10)		

An analysis of the situation might be as follows:

Invest in opening one store now and operating for 1 year. The expected value of the cash flows generated can be used.

Table 8.16 Invest in one store now

Year	0	1
	\$m	\$m
Investment per store	(10)	
Cash flow		11
Net cash flow	(10)	11
Discount factor (10%)	1	0.909
Discounted Cash Flow	(10)	9.999
Net Present Value		(0.001)

This calculation produces an extremely low NPV, and therefore the company may be uncertain as to whether to proceed. However, suppose that management has made the strategic decision that there are significant benefits to entering the new market. They decide to proceed with the risk that if demand is low, the store may lose money.

The cautious approach is to open one store now and then see how demand develops before deciding to invest in second and potential future stores.

If demand conditions are good or bad, it generates the following NPV's under each scenario for the investment in the second store.

Table 8.17 – Best-case scenario

Year	0	1	2
	\$m	\$m	\$m
Investment per store		(10)	
Cash flow good conditions			14
Net cash flow		(10)	14
Discount factor (10%)		0.909	0.826
DCF		(9.09)	11.564
NPV			2.473
Expected value 50%			1.2365

Table 8. 18 – Worst-case scenario

Year	0	1	2
	\$m	\$m	\$m
Investment per store		(10)	
Cash flow bad conditions			8
Net cash flow			8
Discount factor (10%)		0.909	0.826
DCF		(9.09)	6.608
NPV			(2.482)
Expected value 50%			(1.241)

If demand conditions are bad, then the decision would be not to open the second store. A decision must then be made as to whether to close the first store and cut its losses.

However, taking the expected value of the good outcome of \$1.2365, and adding it to the NPV of opening one store in year 1, which was \$(0.001)m, indicates that the value of the option to wait is \$1. 2355m.

This is a relatively crude way of putting a value on the option to wait, and various authors suggest that the options are treated in the same way as financial options, and use the Black-Scholes option pricing model that was developed to place a ‘fair value’ on the options.

8.6.4 Black-Scholes Option Pricing model

The benefit of the Black-Scholes model is that it takes account of the volatility in the future cash flows.

The Black-Scholes formula is given as follows:

$$c = S_0 N(d_1) - K e^{-rT} N(d_2)$$

$$p = K e^{-rT} N(-d_2) - S_0 N(-d_1)$$

$$\text{where } d_1 = \frac{\ln(S_0 / K) + (r + \sigma^2 / 2)T}{\sigma\sqrt{T}}$$

$$d_2 = \frac{\ln(S_0 / K) + (r - \sigma^2 / 2)T}{\sigma\sqrt{T}} = d_1 - \sigma\sqrt{T}$$

c = a call option – this is the right, but not the obligation, to buy a share by, or at, a specified date and price, in the future

p = a put option – this is the right, but not the obligation, to sell a share by, or at, a specified date and price, in the future.

There are five variables that we need before we can calculate the value of a real option. Table 8.19 illustrates how these relate to the financial option calculation.

Table 8.19 Variables for the Black-Scholes model

Symbol	Financial Option	Real Option
S	Stock price	The underlying asset value, which is the present value of future cash flows arising from the project.
K	Strike price	The exercise price, which is the amount paid when the call option is exercised or amount received if the put option is exercised.
T	Time to maturity	Time before the opportunity expires
σ	Volatility	Riskiness of asset/project. This is measured by the standard deviation and can be derived from past projects or estimated using statistical techniques.
r	Risk-free rate	The risk-free rate which is normally taken as the return offered by a short-dated government bill.

[For the mathematicians among the readers, the e in the formula indicates an exponential term, and \ln signifies the natural logarithm. N is the cumulative probability distribution function for a standardized normal variable]

The formula can look quite daunting, but it is relatively easy to undertake using Excel, and there are excellent free resources that can be downloaded to help. In this learning resource, a free resource is used from the Corporate Finance Institute web site that can be found at:

<https://corporatefinanceinstitute.com/resources/templates/excel-modeling/black-scholes-calculator/>

This calculator is free to use for educational purposes, but other sites provide access to a calculator.

Option to wait (example 4)

An organization has the opportunity to bid for a contract that will give it exclusive rights to manufacture and market a new product in its home country. The initial set up costs would be \$50m, and the cash flows generated over four years are estimated as follows:

Table 8.20 Expected cash flows generated

			1	2	3	4
Cash flow \$m			20	25	15	10

However, there is considerable volatility attached to the cash flows. The rights are such that the organization does not have to commence manufacturing straight away but could wait 2 years to see how the market conditions develop before deciding to go ahead and manufacture.

If the organization manufactures immediately, the NPV, assuming a cost of capital of 11% is as follows:

Table 8.21 NPV of manufacturing now

Year	0	1	2	3	4
	\$m	\$m	\$m	\$m	\$m
Initial investment	(50)				
Cash flow		20	25	15	10
Net cash flow	(50)	20	25	15	10
Discount factor 11%	1	0.901	0.812	0.731	0.659
DCF	(50)	18.02	20.3	10.965	6.59
NPV					5.875

The difficulty is the high degree of volatility over the cash flows, which means that the future, if a decision to wait, is taken, could be quite different. The difficulty is how much to bid for the contract. Logic might suggest that the company could offer up to \$5.875m, as this is the estimated NPV of the project. However, what is the value of the option to wait? This is like a call option where the organization pays a cost (the premium) to provide the opportunity to buy a share in the future. The Black-Scholes option pricing formula can be used to calculate a value for this option.

S – the asset value would be the NPV of the cash flows generated if the organization waited. Assuming a cost of capital of 11%, this provides the following net cash flows.

Table 8.22 NPV of waiting to manufacture as input to the Black-Scholes model

Year	0	1	2	3	4	5	6
	\$m	\$m	\$m	\$m	\$m	\$m	\$m
Cash flow				20	25	15	10
Net cash flow	0	0	0	20	25	15	10
Discount factor 11%	1	0.901	0.812	0.731	0.659	0.593	0.535
DCF	0	0	0	14.62	16.475	8.895	5.35
NPV							45.34

$S = \$45.34\text{m}$
 $K = \$50\text{m}$
 $T = 2 \text{ years}$
 $r = 4.5\% \text{ (assumed)}$
 $\sigma = 50\%$

If these values are input to the Black-Scholes formula, it provides the following value of the option.

Table 8.23 Value of call option

Type of Option	Call Option
Stock Price (S_0)	\$ 45.34
Exercise (Strike) Price (K)	\$ 50.00
Time to Maturity (in years) (t)	2.00
Annual Risk Free Rate (r)	4.50%
Annualized Volatility (σ)	50.00%
Option Price	\$ 12.40

Additional Calculation Parameters	
$\ln(S_0/K)$	(0.098)
$(r+\sigma^2/2)t$	0.340
$\sigma\sqrt{t}$	0.707
d_1	0.342
d_2	(0.365)
$N(d_1)$	0.634
$N(d_2)$	0.358
$N(-d_1)$	0.366
$N(-d_2)$	0.642
e^{-rt}	0.91393

The call option has a value of \$12.4m. The organization could, therefore, bid up to \$12.4m for exclusive rights rather than the \$5.875m. The increase in value reflects the fact that there is a period before the decision needs to be made and the volatility of the cash flows. The benefit of the model is that it can take some account of the degree of volatility in the outcomes (future cash flows) without having to undertake numerous NPV calculations. However, as highlighted later, in section 8.6.5, under the limitations of Black-Scholes, the model makes some assumptions about the behavior of the stock market. Therefore, it is always advisable to undertake some sensitivity analysis by adjusting the input values to take account of differing

cash flows and different degrees of volatility. As with any model, it is an aid to decision making, not the decision-maker itself.

Follow-on option (example 1)

This example illustrates the situation where a company has the option to undertake a follow-on project at some point in the future.

Assume the following data has been provided.

Table 8.24 Basic information

Cost of capital	10%
	\$000
Initial investment	(750)
Additional investment in year 2	(600)

Table 8.25 Estimated cash flows of the project

Year	1	2	3	4	5	6	7	8	9	10
	\$000	\$000	\$000	\$000	\$000	\$000	\$000	\$000	\$000	\$000
Net cash flow from first project	150	150	150	150	150	150	150	150	150	150
Net cash flow from additional investment			75	75	75	75	75	75	75	75
	150	150	225	225	225	225	225	225	225	225

If the NPV for the overall project is calculated, it provides the following NPV.

Table 8.26 NPV of total project

Year	0	1	2	3
	\$000	\$000	\$000	\$000
Initial investment	(750)			
Additional investment			(600)	
Cash flow		150	150	225
Net cash flow	(750)	150	(450)	225
Discount factor (10%)	1	0.909	0.826	4.409*
Discounted Cash Flow	(750)	136.35	(371.7)	992.025
Net Present Value				6.675

* using the annuity value for years 3 – 10

The management team is worried that this is quite low.

However, the project could be viewed as consisting of two separate phases.

Table 8.27 – NPV of Phase 1

Year	0	1	2	3
	\$000	\$000	\$000	\$000
Initial investment	(750)			
Cash flow		150	150	150
Net cash flow	(750)	150	150	150
Discount factor (10%)	1	0.909	0.826	4.409
DCF	(750)	136.35	123.9	661.35
NPV				171.6

Table 8.28 NPV of Phase 2

Year	0	1	2	3
	\$000	\$000	\$000	\$000
Initial investment	0		(600)	
Cash flow				75
Net cash flow	0	0	(600)	75
Discount factor (10%)	1	0.909	0.826	4.409
DCF	0	0	(495.6)	330.675
NPV				(164.925)

Phase 1 is positive, but phase 2 is negative, which gives us the low overall NPV for the project. But what if phase 2 is optional? Inputting the values into the Black-Scholes formula, a value for the follow-on option can be calculated.

Note the \$600m is used as the investment required in year 2 for phase 2, but the NPV of the future cash flows of \$330.675m

Table 8.29 Value of call option

Type of Option	Call Option
Stock Price (S_0)	\$ 330.67
Exercise (Strike) Price (K)	\$ 600.00
Time to Maturity (in years) (t)	2.00
Annual Risk Free Rate (r)	5.00%
Annualized Volatility (σ)	50.00%
Option Price	\$ 41.24

Additional Calculation Parameters	
$\ln(S_0/K)$	(0.596)

$(r+\sigma^2/2)t$	0.350
$\sigma\sqrt{t}$	0.707
d_1	(0.348)
d_2	(1.055)
$N(d_1)$	0.364
$N(d_2)$	0.146
$N(-d_1)$	0.636
$N(-d_2)$	0.854
e^{-rt}	0.90484

This gives an option value of \$41.24m. The total NPV could be given as Phase 1 plus the option value. $\$171.6m + \$41.24m = \$212.84$.

Phase 1 is clearly beneficial, and the company then has the option to undertake phase 2 if it finally becomes worthwhile. Note, again, that the benefit of the Black-Scholes model is that it takes account of the volatility of future cash flows.

Option to abandon (example 2)

The two examples using the Black-Scholes model are call options; however, the option to abandon can be viewed like a put option (the right to sell).

XYZ is part of a group of companies that operates worldwide. XYZ is known for its innovative approach to developing new technology projects but often lacks the marketing expertise to exploit its potential fully. To date, XYZ has developed new products that it has effectively sold to the parent company, which then organizes one of the operating subsidiaries to manufacture and distribute the product.

XYZ has developed a new product that is ready for launch, but the senior management team is uncertain about future demand. The marketing department, however, is confident that once consumers use the product and word of the benefits gain momentum, the product will do well. The marketing department is so bullish about the product that they want XYZ to manufacture and distribute the product. The NPV for the product was calculated by the finance department as follows:

Table 8.30 NPV of the project

Year	0	1	2	3	4	5
	\$000	\$000	\$000	\$000	\$000	\$000
Initial investment	(40,000)					
Cash flow		1,750	5,500	12,500	15,000	20,000
Net cash flow	(40,000)	1,750	5,500	12,500	15,000	20,000
Discount rate 10%	1.000	0.909	0.826	0.751	0.683	0.621
DCF	(40,000)	1,591	4,543	9,388	10,245	12,420
NPV						(1,814)

Despite the negative NPV, the marketing department is still extremely keen to launch the product. The chief executive was not entirely convinced and sought advice from their parent company.

The proposal was sent to the parent company for review, and the result was that they liked the idea. However, their operations team was unsure about the reliability of the new technology, so they have agreed that if XYZ wants to take the risk and launch the product, they can do so. Once any teething problems have been sorted out, after 2 years, the parent company would buy the project for \$30,000,000 and manage the project after that.

The marketing department of XYZ insisted that there was a strong possibility that cash flows could improve in the future. The finance department suggested using the Black-Scholes option pricing model to calculate the value of the abandonment option at the end of year 2.

The benefit foregone in this case would be the NPV of the cash flows in years 3 – 5 of (\$9,388 + \$10,245 + \$12,420) \$32,053. The finance department suggested using a volatility of 50% and a risk-free rate of 5%.

Table 8.32 Value of put option

Type of Option	Put Option
Stock Price (S_0)	\$ 32,052.00
Exercise (Strike) Price (K)	\$ 30,000.00
Time to Maturity (in years) (t)	2.00
Annual Risk Free Rate (r)	5.00%
Annualized Volatility (σ)	50.00%
Option Price	\$ 5,940.38

Additional Calculation Parameters	
$\ln(S_0/K)$	0.066

$(r+\sigma^2/2)t$	0.350
$\sigma\sqrt{t}$	0.707
d_1	0.589
d_2	(0.119)
$N(d_1)$	0.722
$N(d_2)$	0.453
$N(-d_1)$	0.278
$N(-d_2)$	0.547
e^{-rt}	0.90484

The put option value – the right to sell the project to the parent company, has a value of \$5,940.

The NPV with the put option is therefore \$5,940 - \$1,814 = \$4,126.

It suggests that it would be worth XYZ undertaking the project with the put option in place; that is the right to sell to the parent company.

8.6.5 Limitations of the Black-Scholes options pricing model

There are some limitations to using the Black-Scholes model of option pricing.

It is useful for valuing European style options where the option has a specific time that it can be exercised. However, many real business decisions are akin to American style options that can be exercised at any time up to the exercise date. The use of the Black-Scholes model, therefore, indicates the likely value. The model also makes some general assumptions about the performance of the stock market, which may not apply directly to real business decisions.

It is also not able to take account of the behavioral aspects of many decisions. As with any business decision, the strategic aspects should always be considered, and a decision should never be made based purely on the numbers. The numbers are only part of the information that is used to make strategic decisions.

Whatever method is used, the accountant can undertake sensitivity analysis to understand the potential impact of inaccurate estimates; that is, what degree of error could be accommodated before the project becomes nonviable in financial terms. Long-term projects inevitably entail making estimates, which could prove to be incorrect due to environmental events beyond the control of the organization. Therefore, testing the estimates can be a valuable exercise.

Investment appraisals are useful in a variety of strategic decisions, such as product development, market development, mergers and acquisitions, customer lifetime profitability, investment in assets such as new technologies, and when making any business case.

8.7 Risk Management

Active reading: Note that not all risk is bad, but that effectively managed some risk can be beneficial. Also, note that the accounting role is to aid in the quantification of risk in financial terms.

There is now an increased awareness of the need to consider strategic risk and the management of risk when making strategic decisions. Therefore, due to the increasing accountability and responsibility attached to good stewardship of organizations, in which accountants play a key role, this section briefly reviews the management of risk.

Toward a Definition of Risk

Risk is often seen as unfavorable; however, in business (and in investment), there is a risk-reward relationship, that is, the higher the risk, the greater the reward. Therefore, not all risk is necessarily a bad thing. Luhmann (1996: 3) defines risk as “the threat or probability that an action or event will adversely or beneficially affect an organization’s ability to achieve its objectives.” This definition suggests that risk can be beneficial as well as adverse. The purpose of risk management is not to eliminate risk, as this might be too costly, but to manage the risk to an acceptable level—acceptable to whom? —the stakeholders, and almost certainly the key players.

Types of Risk

There are many different classifications or types of risks that organizations face. It is not the intention to provide a comprehensive list, but typical headings might include:

- Business or operational risk relating to the activities carried out within an organization
- Financial risk relating to the financial operation of a business
- Environmental risk relating to changes in the political, economic, social, and financial environment
- International risk relating to economic and political factors
- Reputation risk caused by failing to address some other risk

Accountants are likely to experience risk in various situations in the working environment, for example, the financial risk concerning the financing methods and foreign exchange risk. Audit risk in terms of inherent risk that is inherent in some areas, for example, dealing with high volumes of cash, and control and detention risk, that is the whether the control audit tests are likely to find any errors. There are other areas, however, that are not strictly financial where accountants have an input, such as new product development with life cycle and target costing,

investment appraisal, product liability, and personal liability. Risk in all its forms will have some financial consequences for the organization, and therefore it needs effective management.

The Risk Management Process

There are some key steps in managing the risk, most of which are self-explanatory. For example, the risk management process at Lego® sets out to manage the risk by identifying the risk early, ahead of the strategic decision, that is, they are taking the decision knowing what the risks are and how they could be mitigated. They then measure the risk on a risk impact scale. Based on previous experience, they can assess the level of risk that a strategic decision poses to the organization and other stakeholders. This example highlights the importance of monitoring decisions and their outcomes so that it contributes to organizational learning and can inform future decision making. Lego® also assesses the financial impact of the risk. A strategy is then developed to manage the risk, which includes delegating responsibility to managers.

The Committee of Sponsoring Organizations (COSO, 2004) published guidelines on enterprise risk, which recognizes that risk occurs at all levels in the organization, for example, strategic, business, and operational, as well as in all functions. It is also worth noting that many corporate governance codes of practice and laws that have been implemented in different countries require organizations to identify the risks associated with the business and how they intend to manage them.

COSO (2004) highlights the following benefits:

- Risk appetite is considered in setting strategy
- Helps the organization to choose the best risk response
- Reduces operational surprises and losses
- Identify and manage risks across different parts of the organization
- By considering potential events, management is better able to seize opportunities
- Better risk information allows management to deploy capital more effectively

A typical risk management process is set out in Figure 8.5.

A key point to note is that risk is the responsibility of the senior management team; however, they can delegate to a risk management group within the organization, often with a risk manager in charge, but it remains the senior management's overall responsibility. The starting point is the business strategy, as this will ensure that the specific risks associated with a particular course of action are identified. When evaluating risks, the risk appetite is an important concept as individuals have different appetites. For example, some individuals are risk-averse, while others are risk-loving, and others are risk-neutral. The senior management team will include a mix of individuals, all with individual risk appetites, but collectively, via their strategic decisions, the management team will exhibit a risk appetite of its own.

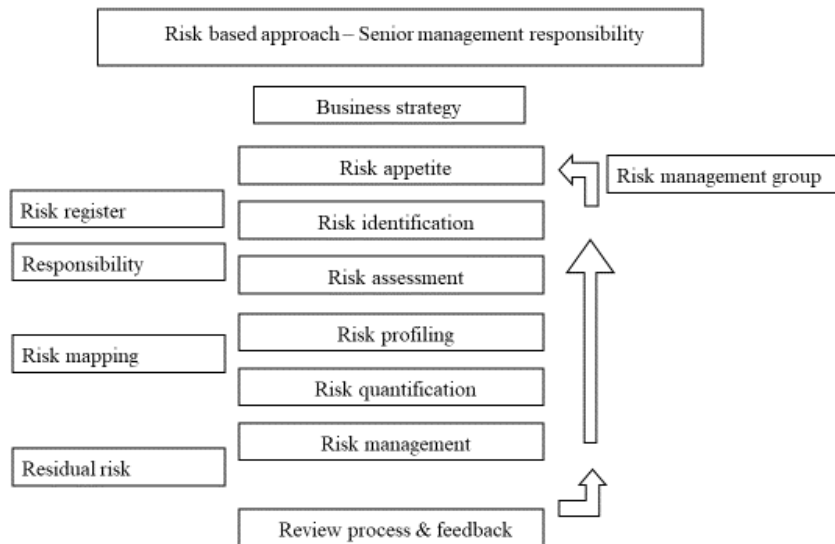


Figure 8.5 The risk management process

The risk appetite of a senior management team is significant as it indicates their willingness to accept and manage risk, which will attract certain types of investors. The risk of strategic options needs to be assessed with knowledge of the kind of investor that the organization attracts. If, for example, a new CEO is appointed who has a different risk profile and convinces the senior management to pursue a more risky strategy to combat the changes in the environment, it may upset some of the more risk-averse shareholders. These shareholders may sell their shares for safer investments, but attract new shareholders who like the more robust risk approach being adopted. This clientele effect of attracting certain types of shareholders can mean that a change in the risk profile of the strategy adopted impacts on the share price, even if only in the short term.

The risk identification stage is self-explanatory in that the risks are identified and, more importantly, are then logged in a risk register with the responsibility being assigned to an individual, which ensures that someone takes responsibility for managing the risk.

The stages of risk assessment, profiling, and quantification merge in that they involve identifying the type of risk, determining the degree of risk, and estimating the potential impact (including the financial impact) of the risk. A business impact analysis identifies and assesses in financial terms and operational terms the effect of disruption on the business. Strategies can then be developed to get the business back up and running as quickly as possible following any disruption. This will involve training people and communicating the recovery plan to make sure that everyone knows what to do if a business disruption event occurs.

Different strategies can be adopted. A simple framework for assessing the degree of risk is shown in Figure 8.6.

		Severity		
		Low	High	
Frequency	Low	Low	Medium	
	High	Medium	High	

Figure 8.6 – Severity versus frequency risk assessment

The matrix enables risks to be assessed in terms of the severity of the impact on the business and the frequency with which events may occur. Strategies shown in Figure 8.7 can then be developed and implemented to mitigate the risk.

		Severity		
		Low	High	
Frequency	Low	Low	Medium	
	High	Medium	High	

STRATEGIES			
Accept	Transfer		
Control	Avoid		

Figure 8.7 – Risk strategies

The labels of accept, transfer, control, and avoid are sometimes given as tolerate, transfer, treat, and tailor. The tailor often suits the high – high category as it there is potentially nothing inherently wrong with a high degree of risk, so long as it is managed correctly.

Some risks are inevitable and may have a low impact on the business but occur infrequently; therefore, the organization may decide to accept the risk and deal with the consequences as they arise. For example, it could be that the incident of product failure is exceptionally infrequent, so a low degree of testing and inspection may be undertaken. In cases where the product is relatively inexpensive, if the product did fail, a policy of merely replacing it free of charge for the customer could be adopted. It may have the added benefit that customers feel good about the organization as the product was replaced without question. This policy links to the cost of quality, as it might be less expensive to simply replace rather than undertake high levels of testing and inspection. The accountants can assist in establishing the trade-off in financial terms.

A typical example of transferring risk is insurance. Also, outsourcing may be an option in situations where a degree of expertise is required. Outsourcing can reduce the risk of the organization undertaking an activity in which it has a lower level of expertise than a specialist organization. In the outsourcing situation, however, the organization does not transfer the full risk as it still has ultimate responsibility for the overall quality of the product or service. Still, it has part of the risk under control as it becomes a contractual risk with the organization to which the activity was outsourced.

Where the risk of failure could occur frequently, the risk can be mitigated by introducing enough controls so that it is managed effectively. It is not, however, just a case of establishing high levels of controls, as to over control an area can be expensive and a waste of time and money, so the risk requires proper assessment. Then an appropriate degree of control can be implemented.

The ultimate objective is to manage risk to an acceptable level as it is not always possible to eliminate the risk altogether. However, the organization must assess whether the residual risk is acceptable to the key stakeholders. The final element is to review the risk and risk management strategy regularly, particularly considering the changing business environment. For example, the growing incidence of cybercrime creates additional risks for organizations that can have reputational impacts.

The control cycle of risk management has three key phases: detection, correction, and prevention. The system in place needs to be able to detect when something has gone wrong. The organization then needs to be able to correct the deficiency. And, crucially, there need to be controls put in place to stop it happening again. It is this phase that, due to pressures of running a business, organizations frequently do not invest enough time and effort in investigating why something went wrong. And subsequently making changes where necessary, or inputting controls so that it does not go wrong again. This follow-up phase is linked very closely with total quality management and lean systems in that continuous improvement is a goal of the organization and identifying failures, correcting them, and preventing them from reoccurring should be part of the culture of the organization.

Learning activity.

The Directors of the E Company Limited are in danger of losing a major contract to a competitor organization, which could result in significant redundancies being necessary to ensure the company's long-term viability. The company produces chemical products that are sold to agricultural sector companies who then mix them in specific quantities to create a range of pesticides and fertilizers that they sell to governments and farmers in less developed countries. The industry is becoming increasingly competitive as the governments can drive down prices by offering volume contracts and, in some instances, incentives to build production plants in the overseas countries, which results in reduced distribution costs.

E Company Limited is under increasing pressure to reduce prices and to cut costs had made changes to the production process by investing heavily in new technology. The introduction of the new process had created a near pollution episode that was recorded by its quality control department. The Production Director was aware of the incident but said nothing to the customer as the event had not created any problems and had been unreported in any external context. None of the other Directors were aware of the incident.

The Company operates a code of conduct that clearly states that the officers must always act with the utmost honesty and integrity. The Company was granted a renewal of the contract as its price was lower than competitors. This lower price was made possible by the reduced costs of production due to the changes made in the production process. However, following the renewal of the contract, an internal audit report identified the pollution incident as a potential risk. The Directors were surprised to see the incident mentioned and were meeting to discuss the action to be taken.

Question 1

Which ONE of the options (A – E) includes the actions listed (i – v) that would be the MOST appropriate in the circumstances?

- (i) Request the resignation of the Production Director for breaking the code of conduct.
- (ii) Seek to ensure that the production process is safe and take positive steps to reduce any risk to a minimum.
- (iii) Inform the customer of the problem, the action taken, and offer to renegotiate the contract.
- (iv) Improve the reporting procedures so that future incidents are brought to the attention of the Board of Directors.
- (v) Return to the previous method of production to avoid the possibility of any pollution.

Options

- A (i), (ii) and (iii) only
- B (ii), (iii) and (v) only
- C (iii), (iv) and (v) only
- D (i), (ii) and (iv) only
- E (i), (iii) and (v) only

Question 2

Which ONE of the following environmental changes is having the MOST significant impact on the performance of the E Company Limited?

- A An increase in the degree of competition in the industry is forcing down margins.
- B An increase in the bargaining power of buyers in the market.
- C Technological developments that provide opportunities to reduce costs.
- D The world economy increasing the importance of efficient food production.

Question 3

Which ONE of the following was the MOST significant risk associated with the contract bid?

- A The loss of production volumes from losing a contract from a major customer.
- B The potential loss of reputation from a reported pollution episode.
- C The risk attached to introducing changes to the production process.
- D The risk associated with capital investment in the new technology.
- E The risk of less developed countries acquiring the capability to produce the chemicals themselves.

Solutions to learning activity:**Question 1 Answer: D****Rationale**

This question tests the ability to identify the ethical dimensions behind a business situation. The company operates a code of conduct which the director broke. If the director is seen to go unpunished, the code loses its integrity and force within the company, therefore the director should resign. Therefore element (i) is relevant.

The importance of identifying a problem and ensuring that safeguards are put in place to protect against a reoccurrence is essential and is the subject of element (ii). Directors are obligated to reduce the incident of risk.

In this instance, the customer has not suffered as a consequence and is not concerned about the internal production process as long as the product is safe. The incident is internal and has now been dealt with, the customer could be informed, but there is no obligation to renegotiate the contract as the customer granted the contract on price, rather than safety aspects of the production process, that is, production safety was not a condition of the contract.

As part of governance, the directors should endeavor to ensure that the reporting procedures are improved to safeguard against another breakdown in the system. Element (iv) is relevant.

The problem has been identified, and procedures can now be implemented to ensure that effective monitoring is put in place. There is no evidence that the process is unsafe. Therefore there is no particular need to return to the old method so long as the Directors take action to reduce the level of risk to an acceptable level.

Together elements (i), (ii), and (iv) indicate the most appropriate actions to take.

Question 2 Answer: B**Rationale**

Although the scenario includes technological development and the corporate social responsibility issues, the critical factor that is increasing competition and driving down margins is the incidence of increased buyer power in all elements of the industry, that is, not just E Company's customers, but also the customers of the customers, such as Governments.

Question 3 Answer: A**Rationale**

The risk to reputation, production, and capital investment can all be controlled to an extent or at least managed. The risk of less developed countries developing the capability themselves is a long-term risk. However, the immediate risk, and the less controllable risk, is the loss of a major contract.

8.8 Summary

Management accounting can contribute to the strategic evaluation in the following ways:

Impact on stakeholder groups

The explanation of stakeholder analysis illustrates that evaluating strategic decisions is much broader than just financial analysis. Accountants can assist the analysis by evaluating the possible impact of stakeholder actions on a strategy by carrying out sensitivity or scenario analysis considering different outcomes—in short, to assess the financial implications of stakeholder actions.

Investment appraisal and business case

Aiding managers in terms of undertaking investment appraisal techniques to evaluate the financial viability of strategic options and assisting in the development of a business case to persuade, inform, and educate stakeholders where necessary.

Closure of the gap

Following on from the investment appraisal and business case, the accountant, can quantify the extent to which the strategies will close the profits gap.

Evaluation and monitoring of risk

Evaluating the financial risks of strategic options and the costs of risk management measures and assisting in the implementation and monitoring of appropriate controls.

8.9 Review questions

- (1) Discuss the benefits of using a framework such as SAFeR to evaluate strategic options.
- (2) Why is it important to consider the expectations of stakeholders when evaluating strategic options?
- (3) Outline the process of stakeholder mapping and the strategies for dealing with different categories open to organizations.
- (4) Briefly outline four different methods of investment appraisal.
- (5) Why is the use of the concept of real options considered useful in strategic option evaluation?
- (6) Outline the risk management process and discuss the role of accountants within the process.
- (7) Briefly discuss four different types of risk that an organization may face and strategies that could be used to mitigate the risk.
- (8) Why is it not necessary to eliminate all risk?
- (9) Critically evaluate the contribution that management accounting can make to the evaluation of strategic options.

8.10 Case study activities 16 – 17 – HW Inc.

The following activities refer to the case study in Appendix A of this learning resource.

Case study activity 16 – HW Inc. Investment appraisal and stakeholders

HW Inc. is considering opening a new warehouse in the North of Belgium. Currently, the stores in Antwerp and Aarschot are serviced by a warehouse just outside of Brussels. Building on its expansion program of opening new stores in Turnhout and Hasselt, and establishing a hub and spoke strategy to its logistics, the local management team of HW Brussels had been asked to investigate the possibility of opening a new warehouse/depot just outside of Herentals. See Figure 8.8.

One of the policies that HW Inc. has set is that for warehouses/depots to be beneficial, they must not cost more than 7% of the revenue generated from goods sold in the stores that it services and for which products pass through the depot. They usually are evaluated over five years based on a net present value calculation using a discount rate of 5%, which represents the relatively low risk attached to such an investment.

The main hub is based in Brussels, which is where the current sales from Antwerp and Aarschot are serviced. The management team believes that it would be more useful to establish a spoke so that a regional depot was supplied from Brussels, which then serviced the current stores in Antwerp and Aarschot, and the new stores in Turnhout and Hasselt. The benefit is that bulk deliveries can be made from Brussels to the regional depot, and smaller vehicles can then be used to split the bulk for delivery to the local stores.

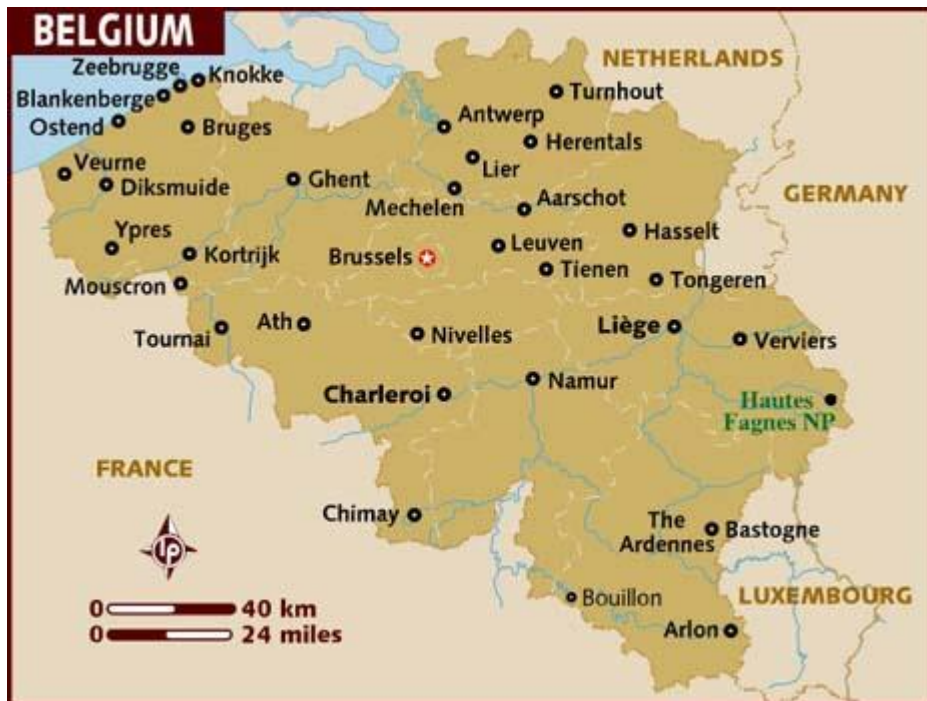


Figure 8.8 Map of Belgium

Current sales in Antwerp are €5.5m per annum and in Aarschot €4.5m per annum. Sales have been constant during the last three years and are expected to remain at that level for the foreseeable future. The stores do good business, but consumers tend to shop locally so, for sales to grow, expanding the number of stores is the best strategy. However, once the new stores are opened, it is expected that there will be some cannibalization of sales, that is, people that visited the stores from Turnhout and Hasselt will now shop in the local stores. It is estimated that the effect will be to reduce the sales in Antwerp and Aarschot by 5%. Forecast sales for Turnhout and Hasselt together are expected to be €4.5m in the first year, growing by 10% (compound) a year for five years before stabilizing.

The cost of the new depot, land, and buildings is estimated to be €0.5m – a potential site has been identified that could be ready for operations within a few months of the decision to go ahead is made. Annual running costs are estimated to be €300,000 per annum, rising each year by inflation of 2.5% per annum. There is local unemployment, so it is expected that labor will not be difficult to obtain. A manager will need to be recruited at a salary of €25,000 per annum, and 20 workers employed on a shift pattern earning an average of €15,000 per annum – all salary costs are expected to increase by inflation. A forklift truck and 2 stackers (a smaller version of a forklift truck) would be needed immediately at a total cost of €18,000. These will be replaced at the end of five years with no residual value.

A fleet of 10 vehicles will be attached to the depot. A deal can be done with a local dealership. The fleet of medium-sized box trucks could be acquired immediately on a five-year lease rental, at a total cost of €250,000, covering the whole five year period. This cost includes maintenance for five years and all operating expenses, subject to a maximum mileage of 100,000 miles for each vehicle within the five years. HW Inc. would need to supply the drivers, who are each expected to earn €18,000 per annum – one driver per vehicle, The existing drivers, have raised some concerns as they see this as potentially reducing their earnings because they

will be making fewer trips and the possibility of earning overtime could be reduced. However, the senior management team of HW Belgium felt that opening the depot would be better for the health of the current drivers and that there is less chance of them going over the maximum driver hours allowed in any one day imposed by the EU.

The central senior management team (C-suite) of HW Inc. is keen to expand in Belgium and is entirely behind the hub and spoke policy of distribution. There is some concern about the impact of BREXIT, but the management team is keen to go ahead anyway. The local bank is more than prepared to offer a competitive loan to finance the purchase of land, buildings, lorries, and forklift trucks at an annual interest rate of 3% as the bank is keen to expand its business with international companies. This cost of finance is not included within the current cost of capital of 5% that HW Inc. typically uses to evaluate investment opportunities. The local management team of HW Belgium feels that this would be the cheapest way to finance the depot and would only use the finance for this project. They, therefore, suggest that the marginal cost of capital of 3% should be used for evaluation purposes.

The local management team is also aware of local residents who have lodged a protest against the proposed site due to the increased number of lorries on the local roads that will result from establishing the depot. Half of the members of the local government (the local council in the Herentals town) are keen to see the development go ahead as it will help with employment. There is a re-election process due within the next six months, so HW Inc. is keen to push for a decision before the local elections. A few councilors have suggested that they would press for traffic restrictions to be put in place, that is, no early morning or late evening deliveries.

The regional authorities (the municipality) are keen to see companies expanding in the area that has the potential to stimulate the local economy and are likely to support the proposal, providing the traffic issue can be resolved. The municipality oversees the local government but traditionally has not involved itself too deeply in local decisions. For the development to go ahead, HW Belgium needs approval from both the local council and the regional authority. Several of the competitor stores are not so impressed and are likely to try and make life difficult for HW Belgium stores to establish themselves in the new locations as the competitors try to hold on to their market share.

Activity requirements:

- (a) Undertaken a net present value calculation to establish whether the planned depot meets the requirements of HW Inc. Also, state any assumptions you make and indicate any other form of analysis that might be useful.
- (b) Undertake a stakeholder analysis for the strategic decision to establish a depot in Herentals. State the stakeholder group, their expectations, and the degree of power they may have concerning the strategic decisions.

Case study activity 17 – HW Inc. Investment appraisal

HW to expand to a new country

HW Inc is planning to increase its business in the emerging economies. The management team has identified Bangladesh as a potential country in which to open stores. Bangladesh is set to be one of the top three fastest growing economies in the next few years. The country has a robust financial sector, and one of the key industries is textiles, which is also a vital export of the region. Its economy has grown on the back of exports of readymade garments. Manufacturers in the region supply clothing to discount companies such as Matalan.

The local management team suggests that it will be possible to open a store in Dhaka and have provided some initial estimates of start-up costs (for ease of use, these have been provided in U.S.\$). These are shown in Table 8.33. They estimate that it will take approximately one year to gain the necessary permissions and establish the store, and trading would be able to begin in the second year.

Table 8.33 Estimated costs and revenues for Bangladesh

	\$
Allowance for legal fees and local agent costs to be paid during the year of set up	150,000
Annual rental of premises – it is anticipated that the premises will be acquired 4 months before the official opening to allow for fitting out the store and the training of staff on the product ranges. 4 months' rent will need to be paid for this period.	300,000
Arrangement fee for property dealer paid before opening plus a commission fee is payable each year equal to 1% of annual rental fee payable each year. Note this is paid from the date of acquisition of the premises, that is, a 1% fee is payable for the 4 months before the official opening	12,000
Fitting out of premises incurred before opening – treated as capital expenditure	400,000
Recruitment and training of staff before opening	50,000
Marketing costs announcing the launch of the store before the official opening	200,000
The initial investment in stock and working capital before opening – treated as capital expenditure	250,000
Sales revenue in the first year of operation following the official opening, rising by 10% per annum	3,000,000
A gross margin of 30% is anticipated	
Operating costs per annum, following the official opening, including all costs except rental of premises. These are expected to rise by 5% inflation in subsequent years.	350,000
For the purpose of planning, assume taxation of 40% is payable on operating cash flows and is paid in the year to which the charge relates. Legal fees and	

agents' fees are deductible expenses for tax purposes, and losses can be carried forward. Capital items are excluded from tax computations.	
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The typical evaluation for these projects is over five years of operation. The cost of capital is estimated to be 6%.

Assume all costs and revenues occur at the end of the year.

Activity requirement:

Evaluate whether the Bangladesh store would be a viable proposition (undertake an NPV calculation over 6 years, that is, year 1 set up, followed by 5 years of trading).

8.11 References

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