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4.5 Strategic and Financial Planning for Clinical Information Systems

CHAPTER OUTLINE

4.5.1 ESTABLISHING MISSION AND OBJECTIVES

Any organization or any organizational unit needs a purpose. That purpose should be readily obvious to all who need to interact with that unit. Over time, as organizations take on more responsibilities or offer more services or products, they become less focused. By establishing a mission and objectives, an organization can recenter its priorities and concentrate on developing its core business.

Every major corporation has a mission and a vision statement. These are usually a few short sentences which convey what the leadership believes the business ought to become. The goals and objectives are more specific and describe what the business hopes to accomplish in the near and long term.

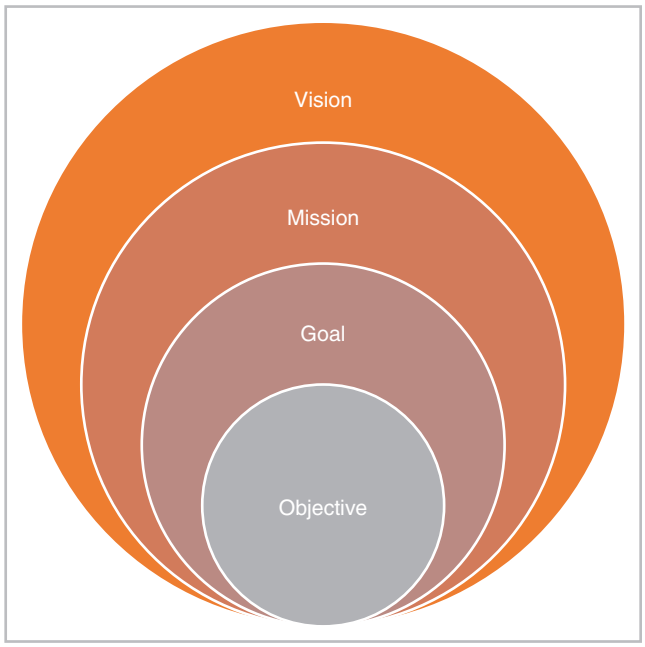
A **vision statement** describes an image or a concept. It expresses where the business hopes to be and what it hopes to achieve. The vision statement uses broad strokes to paint a rosy picture. It avoids the particulars. Richard Branson offers the following advice: “Brevity is certainly key, so try using Twitter’s 140-character template when you’re drafting your inspirational message. You need to explain your company’s purpose and outline expectations for internal and external clients alike”.

Some examples

Chapter 4.5 is an introduction to the terms that businesspeople use all the time. As a clinician, you may find that some of the terms are well-defined and others are more, well, diaphanous. As you can imagine, these airy topics do not make for good board questions. You should be familiar with the concepts, but don’t expect too much activity on the boards.

FIGURE 15-1

Vision, mission goals and objectives



- Ikea: to create a better everyday life for the many people.
- Habitat for Humanity: A world where everyone has a decent place to live.
- Creative Commons: Our vision is nothing less than realizing the full potential of the Internet—universal access to research and education, full participation in culture—to drive a new era of development, growth, and productivity.
- ASPCA: That the United States is a humane community in which all animals are treated with respect and kindness.

Mission statements tend to be more specific (although not always). They usually mention the particular type of business and the changes the business hopes to make.

- Universal health services: To provide superior quality healthcare services that: PATIENTS recommend to family and friends, PHYSICIANS prefer for their patients, PURCHASERS select for their clients, EMPLOYEES are proud of, and INVESTORS seek for long-term returns.
- Creative Commons develops, supports, and stewards legal and technical infrastructure that maximizes digital creativity, sharing, and innovation
- National Wildlife Federation: Inspiring Americans to protect wildlife for our children's future.
- American Heart Association: To build healthier lives, free of cardiovascular diseases and stroke.
- Google: to organize the world's information and make it universally accessible and useful.

It is important to remember that the foregoing discussion applies equally to a large corporation, a department within a corporation or even an individual. For example, the IT department of a hospital may have a vision statement about providing technology that promotes health and saves lives. The mission statement would have a more tangible component. It may promise to deliver excellent technology for the assessment, monitoring and treatment of patients backed up by world-class support and training.

After reviewing the mission and vision statements, the organization lays down its long-term and short term **goals.** Goals can be ambitious or purposeful but usually include specific targets. The term **objectives** is also used for goals, but tends to imply a shorter term project than a goal. For example, a goal might be to achieve 50% market share within the next

10 years. An objective may be to increase production and sales by 10% by the end of the year. *By meeting a series of objectives, we will attain our goal* (see Figure 15-1).

Unlike mission and vision, goals and objectives must be concrete items with a timeframe. The mnemonic SMART (Specific, measurable, achievable, realistic and timely) is often used to make sure that goals and objectives are appropriate.

Actions are the individual tasks undertaken to meet objectives (e.g. buying a new printer; training staff, etc.). Many actions are required to meet an objective, just as many objectives are required to fulfill a mission.

Some authors use a framework called VMOSA: Vision, Mission, Objectives, Strategies, and Action Plans. The notable addition in this structure is **strategy** which will be discussed later (see Sect. 4.5.3, Strategy Formulation)

4.5.2 ENVIRONMENTAL SCANNING

Environmental scanning is the process by which an organization systematically studies its environment in order to make better planning decisions. The scan includes two parts. The internal scan looks within the organization (i.e. the **microenvironment**). The external scan looks at the world in which the organization operates (i.e. the **macroenvironment**).

The **internal scan** should identify the factors that make the company what it is. A company's resources can be both tangible and intangible:

1. Tangible

   (a) Financial resources, such as an endowment or good credit.
   (b) Physical resources, such as a high quality physical plant.
   (c) Technological resources, such as modern medical equipment that may not be commonly available (e.g. robotic surgery apparatus).

2. Intangible

   (a) Human resources, such as highly skilled workers and well-respected managers who work together to develop efficient routines and maintain a respectful corporate culture. A good working environment will lure potential workers away from other employers.
   (b) Innovation resources, such as creative leadership that motivates workers to provide new and better services.
   (c) Reputational resources, (i.e. having a good reputation in the community) will draw customers. Even though patients may receive identical care at two facilities, they will commonly choose the one with a better reputation.

It is noteworthy that a company's intangible resources are more likely to provide a competitive advantage than tangible ones. The reason for this is simple: a well-funded competitor could easily purchase duplicate tangible resources, but would have to develop the intangible ones.

Companies also possess **capabilities**, such as the ability to treat certain ailments or provide useful services. Over time, the company learns how to apply its resources and capabilities very well and develops **core competencies**. These core competencies are the things that distinguish a company from its peers and serve as its competitive advantage. Core competencies directly add value to a product and are difficult to emulate.

Some use the VRIO (Value, Rareness, Imitability, Organization) framework to assess a company's capabilities. Suppose a hospital were evaluating its neurosurgical capability with a non-invasive stereotactic radiofrequency ablation device (e.g. Gamma Knife).

1. Value: Radiofrequency is able to treat certain neurosurgical conditions that would be otherwise untreatable.
2. Rareness: Less than 1% of hospitals have this device.
3. Imitability: For many Gamma Knife procedures, there exist traditional neurosurgical procedures which are not necessarily inferior.
4. Organization: Our hospital has a team of neurosurgeons and technicians who are very familiar with this device and we have nursing units dedicated to the recovery of these patients.

Leaders of the organization should be interviewed or surveyed for their thoughts. Where should the company be in 10 years? Does it have all the resources it needs to get there? Does it have enough resources to survive the coming year? What are the shortfalls that could prevent growth? How do employees interact with one another? What can be said about the overall morale of the company? Does the attitude of the leadership resonate with the rank and file? How well is the current strategy working? Does the company meet its financial or service objectives? How does it compare to industry averages in terms of productivity and profitability? Questions like these will help locate the organization's **strengths** and **weaknesses**.

The **external scan** will identify **opportunities** and **threats.** Factors affecting the external environment include Political, Economic, Social, Technological, Environmental and Legal. For this reason, the external scan is sometimes called a PESTEL analysis.

- Political: Healthcare is susceptible to both local and national politics. The passage of the Patient Protection and Affordable Care Act resulted in huge shifts in payer mixes, mostly through expansion of Medicaid. Similarly, local and regional legislation can affect the way patients seek care.
- Economic: When a recession decreases patients' disposable income they may be less likely to seek care, even when they are sick. When this is coupled with high-deductible insurance policies, the effect is even stronger.
- Social/cultural: Some diseases are much more common in certain demographic groups. In lower-income environments, patients may be suspicious of hospitals and doctors. There may be language issues or other cultural issues which encourage them to seek alternative care. From an IT standpoint, patients without broadband access are unlikely to utilize a personal health record at home.
- Technological: Healthcare organizations with deep investments in technology may be able to operate more efficiently. They may also be able to integrate more easily with other local providers.
- Environmental: Infectious disease, especially those that make headlines (e.g. SARS, Anthrax, Ebola, Zika) can drive patients to seek healthcare in unexpected numbers. Similarly, environmental toxins (like lead found in the drinking water in Flint, Michigan) can increase the incidence of rare diseases and present new opportunities for treatment.
- Legal: The legal environment and the threat of lawsuits can intimidate providers into practicing a form of defensive medicine which is ultimately costly and not evidence based. Note: legal can also be used here to apply to local or national laws regarding the practice of medicine, similar to Political.

A threat may come from competitors, changes in the economy, governmental regulations, shifting payer mix, or changes in habits, size or distribution of its customers. Opportunities may also be uncovered, such as a previously unidentified need or the ability to replace or supersede a competitor.

The results of the environmental scan are often represented in a 2 × 2 table called a **SWOT analysis**, which shows Strengths, Weaknesses, Opportunities and Threats (Figure 15-2).

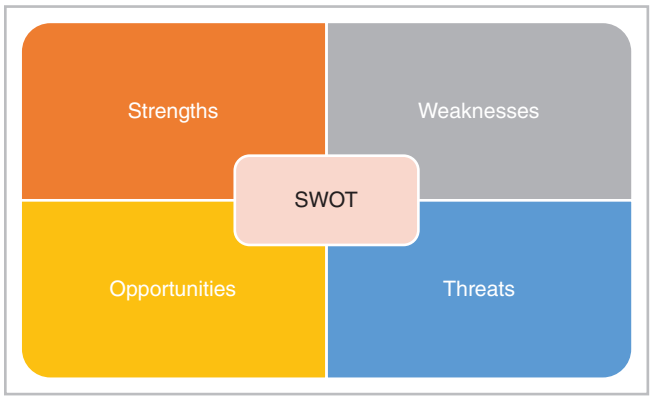


FIGURE 15-2

SWOT analysis examines Strengths, Weaknesses, Opportunities and Threats

TABLE 15-1

EXAMPLE SWOT ANALYSIS

	POSITIVES	NEGATIVES
Internal	**Strengths:** 1. I'm very creative; I often come up with novel solutions to hard problems 2. I get along with most people in the organization and I always try hard to listen 3. I work hard to get good outcomes	**Weaknesses:** 1. I can be unconventional at times and may be perceived as inexperienced. 2. People like me because I'm always agreeable, sometimes too much. 3. I often agree to do things that I don't have time for
External	**Opportunities:** 1. I am very familiar with Big Data, and our organization is moving in that direction. 2. The CIO is nearing retirement age, and there is no clear successor. 3. One of our competitors has reached out to me for advice for one of their projects	**Threats:** 1. The current CMIO is quite capable and has more experience than I do. 2. I have heard that our organization may be merging with a national chain, and jobs may be consolidated. 3. I'm concerned about my health.

Like mission and vision, A SWOT analysis can be performed on an organization, a department or even an individual. Consider the following table generated by an assistant CMIO (Table 15-1).[1]

4.5.3 STRATEGY FORMULATION

After an organization performs a thorough environmental scan and identifies its strengths, weaknesses, opportunities and threats, it must begin to create its **strategy**. A strategy is a set of decisions which should guide an organization to achieve its mission. One way to link these terms is to remember that the mission is **what** we hope to achieve and the vision is **why** it is so important to achieve it. The value network represents the people **who** are responsible for doing the work and the strategy is **how** they plan to go about doing it.

Maintaining a competitive advantage requires both **durability** and **inimitability**. Durability refers to the length of time that a product remains state-of-the art. For example, a hospital invests in a $5 million overhaul of its operating suite, installing new monitors, tables, x-ray equipment and the like. Within 10 years, however, technological advances have rendered the new operating rooms obsolete. This does not imply that the operating rooms are no longer usable—they are still fully functional. It's just that they no longer distinguish the institution from others.

1 Sometimes, you will hear executives say, "I had to SWOT myself." In general, this is what they mean. Not always.

Inimitability refers to the difficulty that competitors would have in creating the same product. For example, the fame or reputation of a single oncologist may be the basis for building an entire cancer center. It may be very difficult for a competitor to find a similar personality.

A successful strategy will develop resources and capabilities which are rare, valuable and difficult to imitate, thus maintaining a competitive advantage.

Strategy formulation tends to fall into one of five functional areas

1. Operations: the provision of medical treatments and diagnostics
2. Finance and accounting: optimizing billing and collections; managing cash and investment reserves; handling debt
3. Marketing: using media outlets to advertise the services offered
4. Human resources: recruiting, supporting and advancing the people of the organization
5. Research and Development: creating new products or services

Resource-based strategies are designed to identify resource gaps and result in investing in replenishing or augmenting the organization's resource base. For example, the orthopedic clinic has been using pre-made splints to treat fractures. When they run out, they begin fashioning splints out of plaster or fiberglass, which takes considerably more time. A potential strategy would involve maintaining a supply of splints.

Companies planning to differentiate themselves on the basis of quality must take steps to assure that the technology is in place to produce high quality products or services. This may include tighter quality control or newer equipment. Similarly, companies pursuing a low-cost strategy may embrace automation or may deliberately opt to use older equipment to minimize costs.

A **value chain** is a set of activities that an organization performs in order to deliver a product or service. Traditional value chain analysis is directed at manufacturing, but is increasingly used in healthcare. For example, a hospital is reviewing its surgical operations, specifically those involving orthopedic implants. It reviews the cost of operating room staff, maintenance, equipment, rehabilitation services, physician services and discharge planning. It discovers, to its dismay, that the cost of the implanted device actually exceeds the insurance reimbursement for the entire hospital stay. A new strategy based on this finding could include curtailing implant surgery or renegotiating rates with insurers and equipment manufacturers.

There is also value in *linking the value chain of a supplier to the value chain of an organization.* For example, many hospitals still rely on a myriad of paper forms in order to document activities. These forms are generally purchased from a forms supplier and stored within the hospital. When the forms run out, new ones are ordered from the supplier. There are several drawbacks to this procedure. Firstly, the hospital has to maintain a storehouse of forms. Second, significant care has to be taken when ordering forms to make sure that the right ones are delivered. Third, unless there is a routine par counting of the forms, the forms will run out before new ones can be ordered. One solution, employed in many hospitals, is to have the forms supplier send a representative to the hospital on a regular basis to determine the current supply of all forms. When forms are running low, the representative replenishes the forms directly from the supplier's warehouse. This process is beneficial for both the supplier and the hospital. The hospital does not run out of forms and the supplier gains additional orders.

The organizational structure (see Sect. 4.4.1) is the formal reporting pattern within the organization. When formulating a strategy, it may become necessary to reorganize the entity so as to align workers to the new policies and procedures.

4.5.4 ACTION PLANNING AND STRATEGY IMPLEMENTATION

Once strategies have been agreed on, the next step is implementation. **Strategy implementation is the translation of chosen strategy into organizational action so as to achieve strategic goals and objectives**. This is where most failures occur. It is not uncommon for organizations to draw up a strategic plan only to find that it sits unimplemented on someone's desk, and has no impact on the organization.

There are significant differences between strategy formulation and implementation (Table 15-2).

Since the plan is developed by top management, it must be communicated (or **cascaded**) to the rank and file workers in the organization. It is important to establish **buy-in** so that each member of the team knows his role and the importance of the plan to the ultimate success of the company. This is usually accomplished by having a respected member of the organization become a **champion** for the project and publically proclaim its value.

In some cases, it may be necessary to employ external consultants to manage the strategy implementation, especially when changes may disrupt a normally amicable relationship between worker and supervisor. Consider a case where the strategic plan identifies a need for a reduction in workforce. It is difficult for a department head to maintain the respect of his workers after he has fired one of their number. On the other hand, when it is an outside consultant, he may be able to salvage some respect.

Reward systems or incentive plans can be strong motivational tools to encourage acceptance of the strategic plan. These may include raises, promotions, awards or stock options. Rewards may be given to managers or to employees throughout the organization as a means of tying recognition to performance.

Even with extremely thorough planning, some uncertainty regarding resource allocation and job allocations will arise only after implementation begins. It is important to have strong leadership involved throughout the implementation process so that mid-course adjustments can be made to keep the project on target.

Developing Action Plans

Action plans are goal and objective driven recipes that tell each member of the organization what is expected of them and in what timeframe. The overall top-level action plan describes how each strategy will be implemented and how it relates to the mission. Each major division in the organization will have its own action plan which relates back to the top-level

TABLE 15-2

COMPARISON OF STRATEGY FORMULATION AND IMPLEMENTATION

STRATEGY FORMULATION	STRATEGY IMPLEMENTATION
Strategy Formulation includes the planning and decision-making involved in developing the organization's strategic goals and objectives	Strategy Implementation involves the resources, people and work required to execute the strategic goals and objectives
Strategy Formulation is an **Entrepreneurial Activity** based on strategic decision-making	Strategic Implementation is mainly an **Administrative Task** based on strategic and operational decisions
Strategy Formulation emphasizes **effectiveness** (the degree to which something is successful in producing a desired result)	Strategy Implementation emphasizes **efficiency** (the degree of effectiveness with respect to cost, resource utilization and time)
Strategy Formulation requires coordination among few individuals	Strategy Implementation requires coordination among many individuals
Strategy Formulation requires a great deal of **initiative and logical skills**	Strategy Implementation requires specific **motivational and leadership traits**

TABLE 15-3

EXAMPLE ACTION PLAN

STRATEGIC GOAL	STRATEGY	OBJECTIVE	RESPONSIBILITY	TIMELINE
Achieve 50% market share	Increase advertising in local trade journals and online	Prepare 5 print advertisements and 5 online advertisements, with budget of $1 million	Marketing team and CEO	3 advertisements by the end of 2Q with the remainder by year end
Achieve 50% market share	Improve customer service	Educate all staff members on AIDET and other customer centric philosophies	Human resources	75% of staff trained by 5/1; 90% of staff by 8/1

TABLE 15-4

COMPARISON OF CAPITAL AND OPERATING BUDGETS

	CAPITAL	OPERATING
Types of activities	Large innovations such as new plants, buildings, equipment, research projects	Day-to-day business operations
Allocation of total budget	33%	67%
Duration	Many years	Usually 1 year or less
Funding source	Retained earnings, equity or debt	Cash flow
Purpose	Grow the business	Run the business

action plan. Every manager (and maybe every employee) has a role in the action plan. Each item in the action plan should specify: the goal to be accomplished; how the goal contributes to the overall strategy; what measurable outcome is expected; what resources and or personnel are required; and the timeframe of the results (Table 15-3).

4.5.5 CAPITAL AND OPERATING BUDGETING

Companies typically have two types of budgets: the capital budget and the operational budget. The operational budget covers day-to-day items required for running the business, such as wages, rent, utilities and temporary equipment. The capital budget is used for larger purchases such as buildings and machinery that are expected to last more than 1 year. Some recommend that one third of a business's total expenditures should go to the capital budget and two-thirds for the operating budget (Table 15-4).

The Operating Budget

In order to create an operating budget, the company must be able to predict how much money it will take in. This calculation produces a projected (pro forma) income statement. The operating budget includes several parts:

- Sales budget: how much money can be expected to be earned by the sale of goods and services
- Production budget: how many units are produced and kept in inventory in preparation for sale
- Direct materials budget: the cost of raw materials that will be used to create the product.
- Direct labor budget: the cost of salary for workers who are producing the product.
- Selling and administrative budget: the cost of advertising and administrator salaries and consultants
- Manufacturing overhead budget: the additional costs of making the product which are not listed above.

Drug and device manufacturers will generally have operating budgets similar to the list above. Hospitals and medical practices are service industries, where the primary output of the organization is not a tangible product like a drug, but a service, like medical consultation. In service industries, the operating budget primarily focuses on sales and labor costs.

The sales budget predicts how much money will be earned by selling goods and services. For example, a manufacturer of implanted cardiac defibrillators will try to estimate the total number of units that they hope to sell in the coming year. By multiplying the cost per unit by the number of units, they arrive at a projected sales budget. In the case of a hospital, the majority of income comes from inpatient admissions. Annual sales would be calculated by multiplying the total number of admissions per year by the average revenue per patient. This calculation takes into account many factors, such as the reimbursement per patient (payer mix); the intensity of services provided to each patient (case mix index); the relative cost to the institution for providing that care (length of stay) and many other statistics.

The Capital Budget

Capital budgeting is also known as investment appraisal because it often involves comparing many different options of spending a company's limited funds. There are several tools which can be used to determine which capital projects are most beneficial to the organization's profitability.

The simplest method is the **accounting rate of return (ARR)** which measures the average profit over investment.

$$ARR = \frac{average\ profit}{average\ investment}$$

For example, suppose a medical office is considering buying a new electrocardiogram (EKG) machine. The cost of the machine is $1000 and is expected to last about 5 years. After that, it will be out of date and can be sold for about $200. The cost of capital investments is spread out over the time that it is used in a process called **depreciation.** Since the usable life of the product is 5 years, and it decreases in value by $800, it is said to depreciate at a rate of $160 per year.

$$annual\ depreciation = \frac{initial\ cost - scrap\ value}{usable\ life} = \frac{\$1000 - \$200}{5\ years} = \$160 / year$$

During that time, the office expects to do 220 EKGs per year, and expects to collect approximately $5 per EKG. Thus, the sales budget for the EKG machine is 220 × $5, or about $1100 per year. ARR is usually expressed as a percentage. Using our equation above,

$$ARR = \frac{1100}{160} = 6.875 = 687.5\%$$

In this example, the EKG machine offers a fantastic return on investment, and the medical practice should definitely invest in it. (Please note that this calculation does not take into account the cost of hiring an EKG technician, the professional time required to interpret the EKG or the supplies and maintenance of the machine.)

Not all investment decisions are so easy. Let's try a more complicated example. Assume that we want to build a surgical suite that has the following expenses. Starting up will require $50,000 in construction costs and another $100,000 in equipment. The equipment is expected to last about 7 years and will have a scrap value of about $10,000. The two **recurring costs** are rent and salaries. Rent on the facility is $15,000 per year and salaries are $130,000 per year. For this case, we will assume that there will be no raises or other changes in personnel costs. During the first year, we expect to do 100 procedures and collect $1000 revenue per procedure. During each subsequent year, we expect our volume to increase by 30 procedures

TABLE 15-5

EXAMPLE SPREADSHEET SHOWING COSTS AND REVENUES FOR A HYPOTHETICAL CLINIC. NUMBERS EXPRESSED IN THOUSANDS. NEGATIVE NUMBERS IN PARENTHESIS

YEAR	0	1	2	3	4	5	6
Equip cost	($100)	$0	$0	$0	$0	$0	$10
Construction	($50)	$0	$0	$0	$0	$0	$0
Rent	($15)	($15)	($15)	($15)	($15)	($15)	($15)
Personnel	($130)	($130)	($130)	($130)	($130)	($130)	($130)
Revenue	$100	$130	$160	$190	$220	$250	$280
Profit	($195)	($15)	$15	$45	$75	$105	$145
Total return	($195)	($210)	($195)	($150)	($75)	$30	$175

per year. Thus, in year 2, we will have 130 procedures. In year 3, we will have 160 procedures, and so on. The following spreadsheet shows our expected cash flows (in thousands). Expenses are expressed as negative numbers and shown in parenthesis. Total return (or profit since inception) shows how much money is made or lost since the beginning of the investment (Table 15-5).

If the projections are correct, the total cost of the project over 7 years is $1,155,000 and it will generate $1,330,000 in revenue, resulting in a net profit of $175,000. On an annual basis, that comes to $165,000 per year in expenses and $190,000 in revenue. Using our ARR formula from above, we can see that this investment yields about 15%.

$$ARR = \frac{profit}{investment} = \frac{190{,}000 - 165{,}000}{165{,}000} = 15.152\%$$

Another useful metric is the **payback period.** This calculates the approximate amount of time required to completely recoup the initial investment. By looking at the total return in the above table, we can see that this occurs sometime between the fourth and fifth year. A shorter payback period indicates a better investment.

One of the drawbacks to using the payback period and the ARR as investment metrics is that they do not account for the **time value of money**, which states that money that is available now is more valuable than the same amount of money in the future because of its potential earning capacity. This is because money that is tied up in one project is subject to inflation and effectively limits the organization's ability to invest in competing projects.

Discounted cash flow (DCF) calculations enable us to account for the time value of money. Let's assume that we have an asset that is worth $100 right now. We can say that its **Present Value (PV)** is $100. If we invest it, and we make 5% interest over the course of a year, we would end up with $105. Using financial terms, the **Future Value (FV)** of $100 in one year is $105, assuming a **discount rate** of 5%. Since the interest applies every year, the FV rises exponentially, as is seen in the following equation, where r is the discount rate and n is the number of years.

$$FV = PV \cdot (1 + r)^n$$

Using this equation, the FV of $100 in 5 years is $128. This calculation can also be used to calculate the PV of a future return. How much should you pay right now to get $100 in 5 years? Using the same equation, we see that the PV of $100 5 years from now is $78, assuming a 5% discount rate.

Going back to our spreadsheet, let's calculate the PV of our revenues and expenses. In year 0, there is no discounting, and FV=PV. At the end of year 1, the FV of our revenue is $130,000. Using our equation, we calculate the PV.

$$\mathrm{FV} = \mathrm{PV} \cdot (1 + \mathrm{r})^{\mathrm{n}}$$

$$130{,}000 = \mathrm{PV} \cdot (1 + 0.05)^{1}$$

$$\mathrm{PV} = 123{,}810$$

TABLE 15-6

EXAMPLE SPREADSHEET INCORPORATING DISCOUNTED CASH FLOW

YEAR	0	1	2	3	4	5	6
Equip cost	($100)	$0	$0	$0	$0	$0	$7
Construction	($50)	$0	$0	$0	$0	$0	$0
Rent	($15)	($14)	($14)	($13)	($12)	($12)	($11)
Personnel	($130)	($124)	($118)	($112)	($107)	($102)	($97)
Revenue	$100	$124	$145	$164	$181	$196	$209
Profit	($195)	($14)	$14	$39	$62	$82	$108
Total return	($195)	($209)	($196)	($157)	($95)	($13)	$95

Similarly, for the second year, the FV of revenue is 160,000.

$$160{,}000 = \mathrm{PV} \cdot (1+0.05)^2$$
$$\mathrm{PV} = 145{,}125$$

It is important to note that both revenues as well as expenses are discounted. Since rent is a fixed cost in our example, we can see that its PV declines from $15,000 at inception to $11,193 at the beginning of year 6 (Table 15-6).

By adding the PV of all the revenues and expenses, we can compute the **net present value (NPV)**, which tells us the value of the entire investment in today's dollars. If the NPV is positive, it is considered a good investment. If the NPV is negative, it is a poor investment. In our case, the NPV is $95,370. Using this data, we can also compute the discounted payback period, or the amount of time it takes for the NPV to reach zero. In our case, this happens between year 5 and 6.

In our example, we used a discount rate of 5%. In real-world calculations, the discount rate should approximate the organization's cost of capital. For example, a company with a good credit rating may be able to borrow money at a low interest rate, while a company that is struggling will have to pay much more. Since companies often have multiple sources of financing, the **weighted average cost of capital (WACC)** is often used as the discount rate. Thus, when using the NPV as an appraisal metric, an investment may be profitable with one discount rate and unprofitable with another.

As the discount rate rises, the NPV decreases. At some point, the NPV reaches zero. This discount rate at this point is called the **internal rate of return (IRR)**[2]. The IRR can be calculated for different projects and used to compare their profitability. Like the ARR, investments with higher IRR are more profitable.

4.5.6 PRINCIPLES OF MANAGERIAL ACCOUNTING

Managerial accounting is the collection of financial data within an institution to enable strategic corporate decision making. There are several key differences between financial and managerial accounting (Table 15-7):

Job Costing

One of the most important tasks for the managerial accountant is to calculate how much it costs the organization to provide its goods and services. This data can be used to determine pricing or to decide which products and services should be offered. For example, an ambulatory surgery center (ASC) wishes to calculate its costs for performing a colonoscopy. Direct labor costs include nursing and technician time. Supplies include intravenous (IV) lines and medications. Overhead includes all other costs, amortized over many procedures and

2 In our example, the IRR is 13.85%, although the calculations required are fairly complex.

TABLE 15-7

FINANCIAL AND MANAGERIAL ACCOUNTING

	FINANCIAL ACCOUNTING	MANAGERIAL ACCOUNTING
Purpose	Describe the financial condition of the business on a particular date	Assist management by providing financial information that is used to plan, implement and evaluate performance
Target audience	External parties, such as shareholders, lenders and regulatory agencies	Managers within the organization
Segment reporting	Pertains to the entire organization. Certain figures may be broken out for materially significant business units	Pertains to individual departments in addition to the entire organization
Timeframe	Historical—reports on the prior quarter or year	Current—data is as up-to-date as possible and often includes forecasts for the future
Format	Financial reports are legally mandated and are presented in a specific format, consistent with the Generally Accepted Accounting Principles (GAAP)	May be presented in any format deemed useful by managers. There is no legal requirement or format
Reporting period	Externally mandated, usually annually or quarterly	Whenever needed. May be annual, monthly or even daily

difficult to quantify by themselves, such as maintenance of the facility, housekeeping, supervision and others. After adding the individual costs, the ASC estimates that it costs approximately $1200 to provide a colonoscopy. This number is very useful as it can inform decisions on how much to charge or whether or not to participate with an insurer.

Margin Analysis

In large production environments, there exist economies of scale. What this means is that when a corporation produces 100,000 items, it can do so more efficiently than it could if it were producing only one or two. However, if the company ramps up production to 100,000 units, it then has to expand its other operations which might be costly. Moreover, it has to be sure that it can actually sell 100,000 units in order to stay profitable.

For example, A nursing home has a capacity of 35 beds, of which 20 are currently occupied. The maximum patient-nurse ratio is 8:1, so there are three shifts of three nurses each day to care for the patients. Let's assume that the staffing cost for nurses is $60 per nurse per hour (3 nurses; 24 h per day; $60 per h; $3 \times 24 \times 60 = \$4320$ per day), and the revenue for 20 patients at $220 per patient is $4400 per day. The managerial accountant performs a **margin analysis** to calculate the total profit per unit of care. It turns out that the nursing home makes only $4 per patient per day.

The CEO of the nursing home is interested in expanding his business. A doctor offers to bring in 5 more patients to the nursing home. Is this a good idea? Raising the census to 25 would raise the revenue to $5500. However, 25 patients would require 4 nurses instead of 3, which raises the nursing costs to $5760 per day, which outstrips the revenue.

The nursing home's CEO asks the managerial accountant for a **breakeven analysis** which is the point at which the profit is exactly zero. The accountant replies that the next breakeven point occurs when the census is 26.18 patients. The CEO returns to the doctor and tells him that if he brings 6 patients, the nursing home would lose money, but if he brought 7, they would have a profit (Figure. 15-3).

Trend Analysis/Forecasting

One of the tasks of the managerial accountant is reviewing the trendline for costs and investigating unusual variances or deviations. This data may be costs paid to vendors, salaries for employees, taxes, regulatory fees or any other business expenses. Income must also be carefully examined. Creating realistic forecasting of income is necessary for developing an operating budget.

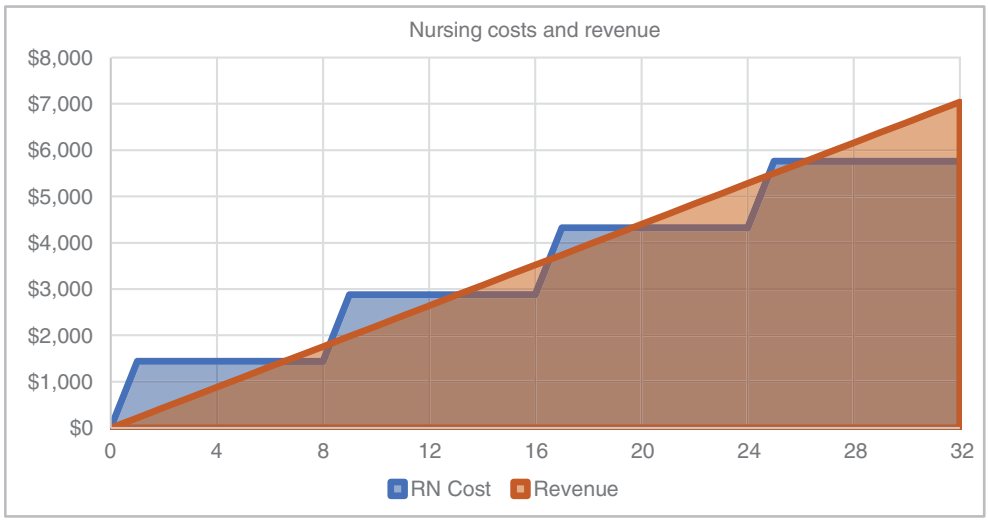


FIGURE 15-3

Example of margin analysis. For some patient volumes, nursing costs preclude making a profit. As volume increases, this happens less frequently

Anomaly detection is a key value of managerial accounting. For example, a managerial accountant is reviewing the cost of medications for an arthritis clinic. He notes that the cost of colchicine has increased nearly 50-fold since last year.[3] As a result, he recommends that the medical executive committee re-asses the value of the drug.

4.5.7 EVALUATION OF PLANNING PROCESS

After the plan is complete, and numerical methods have been applied to ensure success, it becomes time to step back and reassess the plan as a whole and in the context of the organization. The following questions may help guide analysis.

1. Does the plan reflect the mission and vision? Do all the strategies bring the organization closer to the desired outcome? If there are parts of the plan that seem extraneous or misdirected, they must be removed.
2. Is the plan realistic? Can everything really be accomplished within the time and cost constraints?
3. Is the plan balanced? Does it support ALL the organizational goals, or just some of them?
4. Is the plan clear and complete? Does it specify all the tasks that need to be done? Does it include all the details that are required for others to understand and execute it?

3 Lee J. Gout-drug competition returning to market after court fight. Modern Healthcare. January 15, 2015.