Chapter 18 Cash Conversion, Inventory and Receivables Management

Chapter Overview

What Companies Do discusses key lessons to be learned from research in recent years on Australian companies' use of cash. Small businesses in particular are at risk of running out of cash, so the author of the research, Professor Tim Mazzarol, identifies what matters to them.

***What Companies Do* Discussion Questions:**

1. The research does not mention whether a company might wish to return cash to its owners. If a company has a lot of cash compared to industry and historical benchmarks, why might they not return it to the owners of the company?
2. If a company has too little cash, what elements of its business operations are most at risk?

This chapter looks at:

18-1. The Cash Conversion Cycle
18-2. Cost Trade-Offs in Short-Term Financial Management
18-3. Inventory Management
18-4. Accounts Receivable Standards and Terms
18-5. Collecting, Monitoring, and Applying Cash to Receivables

1. **Smart Video.** Jackie Sturm, director of finance for Technology and Manufacturing for Intel, notes the importance of inventory management, stating that inventory loses value the longer it is held.

2. **Smart Video.** Jon Olson, CFO for Xiltrox Corp. notes the importance of cash and therefore the importance of having good collections processes in place.

3. **Smart Concepts.** See a demonstration of the tradeoffs and optimum level of a given operating asset.

4. **Smart Solutions.** A step-by step solution to Problem P18-13.

After studying this chapter you should be able to:

- describe the cash conversion cycle, the company's objectives with regard to it and the actions the company can use to accomplish these objectives
- explain the cost tradeoffs the company must consider when finding the optimal levels of both operating assets and short-term financing
- discuss the key concerns of the financial manager with regard to inventory and some of the popular techniques used to manage it
- review the key aspects of a company's credit standards, including the five C's of credit and the role of credit scoring
- analyse proposed changes in a company's credit standards and its credit terms using both descriptive and quantitative techniques
- understand the collection policy procedures used by companies, the techniques companies use in credit monitoring and the cash application process.

Lecture Guide

A company can greatly improve its financial picture through efficient management of its working capital, including cash, accounts receivable, and inventory.

18-1 The Cash Conversion Cycle

The impact of the cash conversion cycle on a company varies widely across industries and often is at least partially beyond management's control. It can be very different between companies within the same industry. For example, David Jones and Woolworths are both retail stores. Woolworths would be expected to have a shorter cash conversion cycle – it sells more low-priced items, generally for cash. David Jones sells bigger ticket items, such as furniture and appliances, often on credit. The companies and industries with longer operating cycles have a greater need for interim financing.

18-1a Operating Cycle

A company can, however, do its best to manage its cash conversion cycle through turning inventory over as quickly as possible, collect accounts receivable as quickly as possible, pay accounts payable as slowly as possible and manage mail, processing and clearing time to reduce collection times and increase payment times. The central concept in cash conversion is the operating cycle which measures the time that elapses from the receipt of raw materials and the collection of cash from the sale of the product. The longer a company's operating cycle, the greater the need for financing. The two parts of the operating cycle are: inventory and accounts receivable. Remind the students about the ratios they learned in Chapter 2.

18-1b Cash Conversion Cycle

The time between the when the company pays for the materials and the point where it receives payment is the cash conversion cycle or CCC. The difference between the operating cycle and the CCC is the amount of time supplies are willing to extend credit.

Table 18.1 Operating Cycle (OC) and Cash Conversion Cycle (CCC) for Selected Company Types

Fig. 18.1 Time Line for the Operating and Cash Conversion Cycles for Reese Industries

18-1c Shortening the Cash Conversion Cycle

In order to maximise shareholder value, the financial manager should manage assets in such a way as to shorten the cash conversion cycle. A positive cash conversion cycle means that trade credit does not provide enough time to cover the company's entire operating cycle. Some ways to shorten this are listed in this section.

18-2 Cost Tradeoffs in Short-Term Financial Management

Whenever there is a trade-off – a competing cost and benefit – an optimum quantity can be calculated. There is a trade-off involved in each current asset. Holding cash trades off the opportunity cost of funds – how else could the money have been invested – with the insolvency, the price of not having sufficient funds to pay bills. Accounts receivable trades off the cost of supporting accounts receivable and bad debts when policies are too liberal with the opportunity cost of lost sales because credit policies are too restrictive.

Fig 18.2 Tradeoffs of Short-Term Financial Costs

The optimum account balance is at the least cost point on the total cost curve. Short-term financing accounts like accounts payable, accruals and notes payable involve a trade-off between the costs of reduced liquidity due to increasing current liabilities with financing costs resulting from using less expensive short-term debt vs more expensive long-term debt or equity financing.

18-3 Inventory Management

Inventory is considered one of the most important assets. And the tracking of inventory is a very important process. How quickly inventory is turned over is an estimate of the health of not only the company but the economy as a whole. Inventory is a tradeoff between the carrying costs of inventory with the ordering and setup costs associated with replenishment and production of finished goods.

18-3a Investing in Inventory

A company must evaluate its inventory investment in terms of revenues and costs. Logically, an increase in inventory should be justified by additional returns.

18-3b Techniques for Controlling Inventory

- **ABC System**
  - The *ABC system* is a way to classify costs and then pay the most attention to the inventory items that require the most control. This allows managers to make tradeoffs concerning their time. They will spend the most time, effort and dollars concentrating on the inventory items that require the largest investment. In other words, it makes more sense for a company to concentrate, for example, on its production inputs rather than the number of paper clips used by the office support staff.

- **EOQ Model**
  - The economic order quantity, a topic often covered in operations management as well, balances the costs of holding inventory against the costs of placing an order. The company will want to place the fewest number of orders that still allows it to carry sufficient inventory.
  - *Mathematical Approach for EOQ Model:* Once the amount needed, the carrying cost and order cost are known, the company can calculate the optimal size of each order of that item.

- **Reorder Points and Safety Stock**
  - When a company orders more of an inventory item, it generally will take time for that item to arrive in the company's warehouse. When the company knows how many units per day it needs and how many days it takes for an order to arrive, it can calculate at what level inventory should be when the next order is placed. In addition, if the lead time for delivery or use of the inventory item is variable, the company may wish to maintain a safety stock – an additional number of days of inventory to ensure that it will have enough of that inventory item to meet production needs.

- **Material Requirements Planning**
  - This section details another system discussed in the text, material requirements planning. This computerised system uses a master schedule to ensure that the materials, labour and equipment needed for production are at the right places in the right amounts at the right times. These are very sophisticated systems and can be very costly.

- **Just-in-Time System**
  - This section discusses the just-in-time system or JIT. Under JIT, inventory is brought into use upon customer demand.

18-4 Accounts Receivable Standards and Terms

This section can be related to earlier financial statement analysis and ratio analysis chapters. The textbook earlier pointed out that companyies wanted to make most efficient use of their assets by minimising their average collection period. The text pointed out that the average collection period varied across industries, and that it was most helpful to compare a company with others in the same industry.

18-4a Effective Accounts Receivable Management
This section lists the areas of concern in effectively managing the credit and accounts receivable process including how to manage trade credit.

18-4b Credit Standards

- **Granting Credit to Customers**
  - Examining the benefits and costs of implementing a credit policy should be done prior to issuing any type of credit. The type of product can affect the choice of credit and running credit histories on the customers.
- *Student Involvement:*
  - Ask students how the five Cs can be quantified. What ratios can apply to each of the five Cs? For example, debt ratio and times interest earned relate to capacity, the company's ability to repay its debts. The company's balance sheet can demonstrate the strength of its capital. Students can look at the assets on the company's balance sheet to assess collateral. Are the assets very specialised and therefore not worth as much in a fire sale in the event of insolvency? Or, would the assets be transferable to another company at close to full price?

  - These sections give an example of credit scoring – applying objective standards to determine whether a customer should be extended credit. Even if students do not expect to be involved in a company's collection/credit department, they may be interested in the five C's of credit and credit scoring. Anyone who applies for a personal loan or a home mortgage will likely face a similar personal credit review.

Table 18.2 Consumer Credit Application Credit Score by Rockhampton Refineries

Table 18.3 Rockhampton Refineries' Credit Standards

- **Changing Credit Standards**

  - The next section looks at what goes into a company's choice concerning its average collection period. What are the company's policies? How thoroughly does it investigate its customers' credit standing? How efficient is the billing and collection department? How well does the company follow up overdue accounts?

- **Example: Effects of Changes in Credit Standards for YMC**

  - In particular, a company must be concerned about the impact of a change in credit standards. Again, this is a trade-off between costs and benefits. A relaxing of credit standards may bring in more business but may also result in more bad debts. A tightening of credit standards may mean fewer bad debts, but could result in lost business if customers turn to competitors with more generous credit policies.

  - *Costs of Investing in AR*: These sections work through an example of the costs of investing in accounts receivable – the additional investment required times the required return. In other words, if a company invests more in accounts receivable, it must fund that investment, and those moneys will not be available to use elsewhere in the company.

  - *Cost of Marginal Bad Debt Expense*: If the company relaxes its credit standards, it will have also have more bad debts and will face the costs of writing off those bad debts.

The final answer – whether changing credit standards is worthwhile looks at the profit from increased sales minus the cost of additional accounts receivable investment and bad debt. If there is a positive additional profit, the company should change its standards.

18-4c Credit Terms
Credit terms are terms of sale for customers. For example, terms of net 30 mean that the customer has 30 days from the beginning of the credit period to pay the invoice amount. The nature of the company's business will influence its credit terms.

Table 18.4 Analysis of Offering a Cash Discount at Leederville Industries

18-5 Collecting, Monitoring, and Applying Cash to Receivables

18-5a Collection Policy
A company must set its collection policy before any other action can be made. This policy is often a function of the industry in which the company operates and the competitive environment.

18-5b Credit Monitoring
Once a process is in place, it should be regularly evaluated. Credit monitoring can be tied to the previous chapter, which talks about preparing a cash budget. If the collections policy changes, how will this impact the company's cash receipts, and in turn, how will this affect the company's cash position. Will the company need to borrow more to maintain its desired cash balances?

Techniques for monitoring quality of AR: (1) the average collection period, (2) ageing of accounts receivable, and (3) payment pattern monitoring.

Table 18.5 Sample Ageing Schedule for Accounts Receivable

Table 18.6 Forecast Collections for Wagga Wagga Manufacturing Using Payment-Pattern Monitoring

18-5c Cash Application
Cash application is the process through which a customer's payment is posted to its account and the outstanding invoices are cleared as paid. In most business-to-business environments, the typical application method is known as *open item*.

Cash Conversion, Inventory and Receivables Management Summary
This section summarises the marginal costs and benefits of managing cash, accounts receivable, inventory and accounts payable.

Answers to Concept Review Questions

1. The company's cash conversion cycle represents how quickly a company turns its product, from paying for inventory to collecting cash from the customer in payment for finished goods. The financial manager's goal is reduce the cash conversion cycle. The longer the cycle, the greater the need for interim financing to pay for the company's materials needs. The shorter the cycle, the sooner the company receives cash that it can reinvest in the company. A shorter cycle minimises company costs.

2. In order to reduce the length of its cash conversion cycle, the company should have the least amount of inventory possible (as long as there are no stockouts which result in lost sales), the least amount of accounts receivable (collect accounts receivable quickly) and the greatest amount of accounts payable (stretch payments as long as possible).

3. There are costs associated with holding too much and too little of each current asset and liability. For example, if a company has a liberal credit policy, it will attract more customers, resulting in higher sales. However, it will have the cost of supporting the higher level of accounts receivable and possibly more bad debts. If the company has more restrictive credit policies, it may lose sales to competitors with more liberal terms. The company wants to find the amount of each asset that minimises these competing costs.

4. A company with a great deal of short-term financing will have reduced liquidity, but will also have lower costs, since short-term debt is generally less expensive than long-term debt or equity financing – in other words, the greater the amount of short-term financing, the lower the costs to the company. The company will need to balance its desired liquidity, for example, maintaining minimum current or quick ratio, with its desire to reduce the costs of obtaining financing.

5. There are potential conflicts between the finance function view of inventory and that of marketing and production. The financial manager wants to minimise inventory. Funds that are not tied up in inventory can be used for positive net present value investment. The production function, however, wants to ensure that there is adequate inventory so that production can run smoothly, while marketing will want enough inventory to avoid stockouts. Inventory turnover is higher when inventory investment is lower. Inventory turnover refers to how many times the warehouse is emptied and then filled up each year. The higher the inventory turnover, the more efficient is the company's use of inventory (as long as there are not stockouts which adversely impact sales.)

6. In the ABC system, inventory is divided into three groups. A items are those in which the company has the largest investment and therefore the most intensive control. B items require the next largest investment and less intensive control than the A items, and C items require the smallest investment and least intensive control. Separating inventory allows the company to decide what level and type of inventory control is needed. The EOQ model might be used to control A group items. This model considers operating and financial costs and determines the order quantity that minimises overall inventory costs. This model captures opportunity costs because it includes order costs and carrying costs, the cost of holding too much inventory. The model balances carrying and order costs to find the optimal level of inventory.

7. The EOQ model assumes perfect coordination between supplier and user. In reality, the company may not be able to predict the exact time a new order will arrive. In order to ensure that production runs smoothly, the company may want to hold *safety stocks*, extra inventory that takes into account the probability of shipment delays and faster-than-average usage. The *reorder point* is lead time in days times daily usage, and is an estimate of when new orders should be placed. *MRP*, or *material requirements planning*, is a computerised system to control the flow of resources. It uses a master schedule to ensure that production needs are at the right time and place in the correct amounts. *Manufacturing requirements planning II* expands on MRP. Its computerised system integrates data from financing, marketing, engineering and manufacturing. It generates a production plan for the company, along with management reports, forecasts and financial statements. *Just-in-time* is a system with the core principle that materials should arrive exactly when they are needed for production. A computerised system like MRP can state when the materials will be needed, and just-in-time principles state that the materials should be ordered to arrive precisely when the MRP schedule says they will be needed. JIT can reduce inventory levels and carrying costs, allowing the financial manager to invest these funds in more productive uses.

8. A company's credit terms typically conform to those of its industry. If they did not, then customers would be more likely to patronise competitors with more liberal credit policies. The company can, however, compete on other than credit terms. For example, the company could offer faster delivery or higher quality, which might attract more customers even if the credit policies were more restrictive.

9. The five Cs of credit are used to perform in-depth credit analysis but don't provide a specific accept or reject decision. Applying the five Cs requires an analyst experienced in reviewing and granting credit requests. Applying the five Cs is costly and time-consuming, and therefore is applied primarily to high-dollar credit requests.

10. Credit scoring applies statistically derived weights for key financial and credit characteristics to predict whether a potential customer will pay in a timely manner. The score measures the applicant's overall credit strength. It is most commonly used by large credit card operations, such as those of banks, oil companies and department stores.

11. When considering changing credit standards, the company must look at what impact a change would have on sales, costs and overall cash flows. A restrictive credit policy could cost the company lost sales, while relaxing standards could lead to an increase in bad debts. Relaxing credit standards generally increases sales and bad debt expense. Tightening credit standards lowers accounts receivable and bad debts but also lowers sales and profits.

12. We use only variable costs of sales when estimating the average investment in accounts receivable because the model assumes an increase in sales will not cause fixed costs to increase. There is an opportunity cost of increasing accounts receivable – the higher level of accounts receivable must be financed and there is a cost associated (interest expense) with higher levels of financing.

13. Credit terms include when the customer must pay and if the customer receives discounts for paying before the bill is due. Credit terms are influenced by the nature of the business. For example, a company with perishable items will have short credit terms, since there is little value to repossessing the items if the bill is not paid on time. A company in a seasonal business may use seasonal dating, fitting credit terms to fit industry cycles.

14. Collection policy refers to the procedures used by a company to collect overdue accounts receivable. A company may start with a reminder, form letter, phone call, or visit to encourage customer payment. The company may suspend further sales until the delinquent account is made current. Next, the company may negotiate with the customer for past due amounts and report the customer to credit bureaus. If the goods were sold with a lien attached, collateral or corporate or personal guarantees, the company may pursue these options to obtain payment. As a last resort, the account may be turned over to a collection agency or referred to a solicitor.

15. A company should actively monitor accounts receivable to ensure that customers are paying in a timely manner. For example, are customers complying with the company's credit terms or are they taking longer to pay than the company's policies allow? At some point the company may need to turn overdue accounts over to a collection agency or take legal actions to collect. By monitoring *average collection period*, the company can see if its terms are generally being met. For example, if the company extends credit for 30 days and it has a 45 day collection period, then customers on average are significantly slower in paying than company policies allow. *Ageing of accounts receivable* shows what per cent of accounts are not paid in a timely manner. *Payment-pattern* monitoring is helpful if the company has very cyclical sales patterns. The payment-pattern is the normal timing in which a company's customers pay their accounts, expressed as a percentage of monthly sales collected in each month following the sale. By tracking patterns over time, the company can determine its average pattern.

Solutions to Self-Test Problems

ST18-1. Aztec Products wishes to evaluate its cash conversion cycle (CCC). Research by one of the company's financial analysts indicates that on average the company holds items in inventory for 65 days, pays its suppliers 35 days after purchase, and collects its receivables after 55 days. The company's annual sales (all on credit) are about $2.1 billion, its cost of goods sold

represent about 67% of sales, and purchases represent about 40% of cost of goods sold. Assume a 365-day year.

a. What is Aztec Products' *operating cycle (OC)* and *cash conversion (CCC)*?
b. How many dollars of resources does Aztec have invested in (1) inventory, (2) accounts receivable, (3) accounts payable, and (4) the total CCC?
c. If Aztec could shorten its cash conversion cycle by reducing its inventory holding period by 5 days, what effect would it have on its total resource investment found in part b(4)?
d. If Aztec could shorten its CCC by 5 days, would it be best to reduce the inventory holding period, reduce the receivable collection period, or extend the accounts payable period? Why?

A: a. Operating cycle = Average age of inventory + Average collection period
OC = AAI + ACP
= 65 days + 55 days
= 120 days

Cash conversion cycle = Operating cycle – Average payment period
CCC = OC – APP
= 120 days – 35 days
= 85 days

b. (1) Inventory = ($2.1 billion x 67%) × (65/365) = $250.6 million

(2) Accounts receivable = ($2.1 billion) × (55/365) = $316.4 million

(3) Accounts payable = ($2.1 billion × 67% × 40%) × (35/365) = $54 million

(4) Total resources invested = $250.6 million + $316.4 million – $54 million
= $513.0 million

c. New inventory investment = ($2.1 billion × 67%) × [(65 – 5)/365] = $231.3 million

Change in resource investment = Change in inventory investment
= $231.3 million – $250.6 million
= −$19.3 million

The total resource investment would be reduced by $19.3 million.

d. It would be best to reduce the receivable collection period because the receivables account for the largest annual dollar investment – $2.1 billion – whereas the annual inventory investment equals 67 per cent of that amount, and annual purchases equal 40 per cent of the inventory investment.

ST18-2. Vargas Enterprises wishes to determine the economic order quantity (EOQ) for a critical and expensive inventory item that is used in large amounts at a relatively constant rate throughout the year. The company uses 450,000 units of the item annually, has order costs of $375 per order, and its carrying costs associated with this item are $28 per unit per year. The company plans to hold safety stock of the item equal to 5 days of usage, and it estimates that it takes 12 days to receive an order of the item once placed. Assume a 365-day year.

a. Calculate the company's *EOQ* for the item of inventory described above.
b. How many units of *safety stock* should Vargas hold?
c. What is the company's *reorder point* for the item of inventory being evaluated? (*Hint*: Be sure to include the safety stock.)

A: a. S = 450,000 units; O = $375/order; C = $28/unit/year

$$EOQ = \sqrt{\frac{2SO}{C}} = \sqrt{\frac{2 \times 450{,}000 \times \$375}{\$28}} = \sqrt{12{,}053{,}571} = 3{,}472 \text{ units}$$

b. Daily usage = 450,000 ÷ 365 = 1,233 units
Safety stock = 5 days × 1,233 units/day = 6,165 units

c. Reorder point = (lead time in days × daily usage) + safety stock
= (12 days × 1,233 units/day) + 6,165 units
= 20,961 units

ST18-3. Belton Company is considering relaxing its credit standards to boost its currently sagging sales. It expects its proposed relaxation will increase sales by 20% from the current annual level of $10 million. The company's average collection period is expected to increase from 35 days to 50 days and bad debts are expected to increase from 2% of sales to 7% of sales as a result of relaxing the company's credit standards as proposed. The company's variable costs equal 60% of sales and their fixed costs total $2.5 million per year. Belton's opportunity cost is 16%. Assume a 365-day year.

a. What is Belton's *contribution margin*?
b. Calculate Belton's *marginal profit from increased sales*.
c. What is Belton's *cost of the marginal investment in accounts receivable*?
d. What is Belton's *cost of marginal bad debts*?
e. Use your findings in parts (b), (c), and (d) to determine the net profit (cost) of Belton's proposed relaxation of credit standards. Should they relax credit standards?

A: a. Contribution margin = 1.00 – variable cost percentage = 1.00 – 0.60 = 0.40 = 40%

b. Marginal profit from increased sales = ∆sales × contribution margin
= ($10 million × 20%) × 40%
= $800,000

c. Cost of marginal investment in accounts receivable:
Investment in accounts receivable = Total variable cost/A/R turnover
After relaxation: ($12 million × 60%) / (365/50) = $986,301
Before relaxation: ($10 million × 60%) / (365/35) = $575,342
Marginal investment in A/R = $986,301 – $575,342 = $410,959
Cost of marginal investment in A/R = $410,959 × 16% = $65,753

d. Cost of marginal bad debts:
Cost of bad debts = Annual sales × Bad debt expense rate
After relaxation: $12 million × 7% = $840,000
Before relaxation: $10 million × 2% = $200,000
Cost of marginal bad debts = $840,000 – $200,000 = $640,000

e. Summary:

Marginal profit from increased sales =	$800,000
Less: Cost of marginal investment in A/R =	65,753
Less: Cost of marginal bad debts =	640,000
Net profit from proposed relaxation	$ 94,247

Recommendation: Belton Company should relax its credit standards as proposed because it will result in an annual increase in profits of $94,247.

Answers to End-of-Chapter Questions

Q18-1. If you randomly chose a sample of companies and then calculated the operating cycle (*OC*) of each company, what is likely to be the key cause of differences in their operating cycles? What goal should these companies attempt to achieve with regard to their *OC*s? How and why?

A18-1. The key cause of differences in operating cycles is the nature of the company's business. Some companies have most of their sales in cash and therefore have minimal accounts receivable. Others might have a very long production process, and therefore need to pay for materials far sooner than collections from sales can be made. Each company should minimise its operating cycle, within the limits of the business.

Q18-2. Why would a company wish to minimise its cash conversion cycle (*CCC*) even though each of its components is important to the operation of the business? What key actions should the company pursue to achieve this objective?

A18-2. A company wishes to convert raw material expense into cash as quickly as possible. As with the operating cycle, collecting sooner and paying later provide the company with the most cash available for investing. The company should work to maximise its inventory turnover, minimise its average collection period, and maximise its average payment period.

Q18-3. Describe the impact that aggressive action aimed at minimising a company's cash conversion cycle (*CCC*) would have on the following financial ratios: inventory turnover, average collection period, and average payment period. What are the key constraints on aggressive pursuit of these strategies with regard to inventory, accounts receivable, and accounts payable?

A18-3. If a company aggressively minimised its cash conversion cycle, its inventory turnover will increase, average collection period will decrease and average payment period will increase. The key constraint concerning inventory is the need to prevent stockouts that might cause lost sales. Accounts receivable policies must ensure that 'too-tight' credit policies don't cause customers to turn to competitors. Accounts payable policies must ensure that good relations with vendors are maintained with longer payment periods.

Q18-4. What are the principal cost tradeoffs that the financial manager must focus on when attempting to manage short-term accounts in a manner that minimises cash? Prepare a graph describing the general nature of these cost tradeoffs and the optimal level of total cost.

A18-4. There are costs associated with holding too much and too little of each current asset and liability. For example, if a company has a liberal credit policy, it will attract more customers, resulting in higher sales. However, it will have the cost of supporting the higher level of accounts receivable and possibly more bad debts. If the company has more restrictive credit policies, it may lose sales to competitors with more liberal terms. The company wants to find the amount of each asset that minimises these competing costs. Figure 18.2 provides a picture of the trade-off between competing costs, showing a picture of the lowest total cost, the optimal balance.

Q18-5. Assume that the financial manager is considering stretching the company's accounts payable by paying its vendors at a later date. What are the key cost tradeoffs that would be involved when making this stretching decision? How would you quantitatively model this decision?

A18-5. If a company stretches its payments to vendors, it may anger its suppliers and potentially have difficulty getting shipments in the future. The company might also be giving up discounts for

early payment. The manager must look at the incentive for paying early vs the cost of financing from other sources.

Q18-6. What is the primary goal of the financial manager with regard to inventory management? How does this goal compare to the inventory goals of production and marketing?

A18-6. The financial manager's goal is to move inventory quickly, which will minimise its investment, but he/she should also be sure to maintain adequate inventory to meet demand and minimise stockouts, which can result in lost sales. The manager must determine the optimal inventory level to balance these conflicting objectives.

Q18-7. What trade-off confronts the financial manager with regard to inventory turnover, inventory cost, and stockouts? In what way is inventory viewed as an investment?

A18-7. The faster the inventory turnover, the less dollar investment needed. Inventory turnover refers to the number of times the company fills up and then empties its warehouse. Inventory cost refers to the cost of placing order and to the carrying cost of inventory. Stockouts occur when the company does not have sufficient inventory on hand, which adversely impacts the production process. The manager wants to increase inventory turnover and reduce inventory costs without having costly stockouts.

Q18-8. Why is it important for the financial manager to understand the inventory control techniques used by production/operations managers? How does controlling inventory impact a company's profitability?

A18-8. Funds tied up in inventory investment have an opportunity cost. These funds could be invested profitably elsewhere if inventory investment were not needed. The financial manager must understand the production department's inventory control techniques in order to minimise the investment in inventory and free up the maximum amount of funds for investment in positive net present value projects.

Q18-9. What role does the *ABC system* play in inventory control? What group of inventory items does the *EOQ model* focus on controlling? Describe the objective and cost trade-off addressed by the EOQ model.

A18-9. Funds tied up in inventory investment have an opportunity cost. These funds could be invested profitably elsewhere if inventory investment were not needed. The financial manager must understand the production department's inventory control techniques in order to minimise the investment in inventory and free up the maximum amount of funds for investment in positive net present value projects.

Q18-10. Why would a company extend credit to its customers given that such an action would lengthen its cash conversion cycle? What key cost tradeoffs would be involved in this decision? What typically dictates the actual credit terms the company extends to its customers?

A18-10. A company might extend credit in order to obtain higher sales. The manager must balance the higher sales and profits against higher costs of holding more accounts receivable and higher bad debts. The main factor in determining credit terms is the industry practice. If a company has credit terms that are too restrictive, relative to its competitors, it is more likely to lose sales.

Q18-11. Why is using the *five Cs of credit* the appropriate credit selection procedure for high-dollar credit requests but not appropriate for high-volume–low-dollar requests (such as department store credit cards)?

A18-11. The five Cs are more appropriate for high dollar clients because applying them requires an analyst experienced in reviewing and granting credit requests. A great deal of time and expense is involved in applying the five Cs. High volume, low dollar credit requests may not justify the expense of evaluating the five Cs.

Q18-12. What is *credit scoring?* In what types of situations is it most useful? If you were developing a credit scoring model, what factors might be most useful in predicting whether or not a credit customer would pay in a timely manner?

A18-12. Credit scoring applies statistically derived weights for key financial and credit characteristics to predict whether a potential customer will pay in a timely manner. The score measures the applicant's overall credit strength. It is most commonly used by large credit card operations, such as those of banks, oil companies and department stores. Most useful factors might include credit references, home ownership, income range, payment history, year at address and years on the job.

Q18-13. What are the key variables to consider when evaluating potential changes in a company's credit standards? Why are only variable costs of sales included when estimating the company's average investment in accounts receivable?

A18-13. When considering changing credit standards, the company must look at what impact a change would have on sales, costs and overall cash flows. A restrictive credit policy could cost the company lost sales, while relaxing standards could lead to an increase in bad debts. Relaxing credit standards generally increases sales and bad debt expense. Tightening credit standards lowers accounts receivable and bad debts but also lowers sales and profits. We use only variable costs because the model assumes an increase in sales will not cause fixed costs to increase.

Q18-14. For a company contemplating an increase in the cash discount it offers credit customers for early payment, what key variables should be considered when quantitatively analysing this decision? How do the variables used in this analysis differ from those considered when analysing a potential change in the company's credit standards?

A18-14. If a company is considering increasing its cash discount, it must look at its own cost of financing. It is in essence providing financing to its customers. If it can obtain its own financing more cheaply, then it would make sense to offer increased financing to its customers. Here the focus is more on the cost of the company's borrowing, rather than the impact of policies on sales and profits, as is the case with changing the company's credit standards.

Q18-15. What is *credit monitoring?* How can each of the following techniques be used to monitor accounts receivable? What are their attributes?

a. Average collection period
b. Ageing of accounts receivable
c. Payment-pattern monitoring

A18-15. Credit monitoring involves the ongoing review of a company's accounts receivable to determine if customers are paying according to the stated credit terms. If customers are not paying on time, credit monitoring will alert the company to the problem. Average collection period allows the company to determine if there is a general problem with accounts receivable. Ageing of accounts receivable allows the company to see what percentage of customers at any given time are falling behind on their payments. The payment pattern is the normal timing in which a company's customers pay their accounts, expressed as a

percentage of monthly sales collected in each month following the sale. By tracking patterns over time, the company can determine its average pattern.

Solutions to End-of-Chapter Problems

The Cash Conversion Cycle

P18-1. Kiwi Products is concerned about managing its operating assets and liabilities efficiently. Inventories have an average age of 110 days, and accounts receivable have an average age of 50 days. Accounts payable are paid approximately 40 days after they arise. The company has annual sales of $36 million, its cost of goods sold represents 75% of sales, and its purchases represent 70% of cost of goods sold. Assume a 365-day year.

a. Calculate the company's operating cycle (*OC*).
b. Calculate the company's cash conversion cycle (*CCC*).
c. Calculate the amount of total resources Kiwi Products has invested in its *CCC*.
d. Discuss how management might be able to reduce the amount of total resources invested in the *CCC*.

A18-1. a. The company's operating cycle is the sum of its average age of inventory (AAI) and average collection period (ACP) = 110 days + 50 days = 160 days

b. CCC = OC – APP = 160 – 40 = 120 days

c. Resources invested in the cash conversion cycle:

Inventory = $36,000,000 × 75% × 110/365 =	$ 8,136,986
+ Accounts receivable = 36,000,000 × 50/365 =	4,931,507
– Accounts payable = 36,000,000 × 75% × 70% × 40/365 =	2,071,233
= Resources invested of	$10,997,260

d. Management can work to reduce the amount of cash tied up in the cash conversion cycle by turning inventory more quickly, collecting accounts receivable more quickly, and paying payables more slowly.

P18-2. The cash conversion cycle is an important tool for the financial manager in managing the day-to-day operations of the company. As an investor, knowing how the company manages its *CCC* would provide useful insights about management's effectiveness in managing the company's resource investment in the *CCC*. Access Microsoft's annual statement at http://www.microsoft.com, and calculate Microsoft's *CCC*. Discuss any difficulties you had in obtaining adequately detailed data from Microsoft's Web site for use in calculating its *CCC*. Evaluate Microsoft's *CCC* in light of your calculations.

A18-2. Internet exercise – answers will vary.

P18-3. A company is weighing five plans that affect several current accounts. Given the five plans and their probable effects on inventory, receivables, and payables (as shown in the following table), which plan would you favour? Explain.

	Change		
Plan	**Average Age of Inventory (days)**	**Average Collection Period (Days)**	**Average Payment Period (Days)**
A	+35	+20	+10
B	+20	−15	+10
C	−10	+5	0
D	−20	+15	+5
E	+15	−15	+20

A18-3.

Plan	Inventory (I)	Collections (C)	Payments (P)	Change in CCC(I+C–P)
A	+35	+20	+10	+45
B	+20	–15	+10	–5
C	–10	+5	0	–5
D	–20	+15	+5	–10
E	+15	–15	+20	–20

Plan E will have the most beneficial impact on the collection cycle, with an increase in inventory and a decrease in the collection period cancelling each other, leaving payments stretched by 20 days. This plan results in the biggest reduction (20 days) in the CCC.

P18-4. King Manufacturing turns its inventory 9.1 times each year, has an average payment period of 35 days, and has an average collection period of 60 days. The company's annual sales are $72 million, its cost of goods sold represents 50% of sales, and its purchases represent 80% of cost of goods sold. Assume a 365-day year.

a. Calculate the company's operating cycle (*OC*) and cash conversion cycle (*CCC*).
b. Calculate the company's total resources invested in its *CCC*.
c. Assuming that the company pays 14% to finance its resource investment in its *CCC*, how much would it save annually by reducing its *CCC* by 20 days if this reduction were achieved by shortening the average age of inventory by 10 days, shortening the average collection period by 5 days, and lengthening the average payment period by 5 days?
d. If the 20-day reduction in the company's *CCC* could be achieved by a 20-day change in only one of the three components of the *CCC*, which one would you recommend? Explain.

A18-4. a. The company's AAI is 365/9.1 = 40 days in inventory on average
OC = AAI + ACP = 40 + 60 = 100 days
CCC = OC – APP = 100 – 35 = 65 days

b. Resources invested in the cash conversion cycle are:

Inventory = $72,000,000 × .5 × 40/365 =	$ 3,945,205
+ Accounts receivable = $72,000,000 × 60/365 =	11,835,616
– Accounts payable = $72,000,000 × .5 × .8 × 35/365 =	2,761,644
= Resources invested of	$13,019,177

c. If it reduces CCC by 20 days,

Resources invested in the cash conversion cycle are:

Inventory = $72,000,000 × .5 × 30/365 =	$ 2,958,904
+ Accounts receivable = $72,000,000 × 55/365 =	10,849,315
– Accounts payable = $72,000,000 × .5 × .8 × 40/365 =	3,156,164
= Resources invested of	$10,652,055

Reduction in resource investment = $13,019,177 – $10,652,055 = $2,367,122.
The annual savings from the reduced investment = 0.14 × $2,367,122 = $331,397.

d. If the change of 20 days could be accomplished in just one component, then it should be accomplished by reducing the company's collection period. This is most directly tied to sales and makes the biggest dollar contribution per day saved toward the reduction in resources invested.

P18-5. Bradbury Corporation turns its inventory five times each year, has an average payment period of 25 days, and has an average collection period of 32 days. The company's annual sales are $3.6 billion, its cost of goods sold represents 80% of sales, and its purchases represent 50% of cost of goods sold. Assume a 365-day year.

a. Calculate the company's operating cycle (*OC*) and cash conversion cycle (*CCC*).
b. Calculate the total resources invested in the company's *CCC*.
c. Assuming that the company pays 18% to finance its resource investment, how much would it increase its annual profits by reducing its *CCC* by 12 days if this reduction were solely the result of extending its average payment period by 12 days?
d. If part (c)'s reduction in the company's *CCC* could alternatively have been achieved by shortening either the average age of inventory or the average collection period by 12 days, would you have recommended one of those actions rather than the 12-day extension of the average payment period specified in part (c)? Which change would you recommend? Explain.

A18-5. a. The company's AAI is 365/5 = 73 days in inventory on average
OC = AAI + ACP = 73 + 32 = 105 days
CCC = OC – APP = 105 – 25 = 80 days

b. Resources invested in the cash conversion cycle are:

Inventory = $3,600,000,000 × .8 × 73/365 =	$576,000,000
+ Accounts receivable = $3,600,000,000 × 32/365 =	315,616,438
– Accounts payable = $3,600,000,000 × .8 × .5 × 25/365 =	98,630,137
= Resources invested of	$792,986,301

c. If it reduces CCC by 12 days solely by extending the average payment period by 12 days, Resources invested in the cash conversion cycle are:

Inventory = $3,600,000,000 × .8 × 73/365 =	$576,000,000
+ Accounts receivable = $3,600,000,000 × 32/365 =	315,616,438
– Accounts payable = $3,600,000,000 × .8 × .5 × 37/365 =	145,972,603
= Resources invested of	$745,643,835

Reduction in CCC investment = $792,986,301 – $745,643,835 = $47,342,466

Increase in annual profits from reduction in CCC = .18 × $47,342,466 = $8,521,644

d. A 12-day reduction in the average collection period would have had a bigger impact, as would a 12-day reduction in the average age of inventory. In the calculation, accounts payable are reduced by both the per cent of cost of goods sold and the per cent of cost of goods sold that is represented by purchases. Because the accounts receivable investment is based on sales rather than cost of goods sold for inventory, a reduction in the average collection period would provide the largest reduction in resource investments and therefore the largest profit increase. The 12-day reduction in the average collection period is recommended.

Cost Tradeoffs in Short-Term Financial Management

P18-6. Geet Industries wants to install a just-in-time (JIT) inventory system in order to significantly reduce its in-process inventories. The annual cost of the system is gauged to be $95,000. The financial manager estimates that with this system, the company's average inventory investment will decline by 40% from its current level of $2.05 million. All other costs are expected to be unaffected by this system. The company can earn 14% per year on equal-risk investments.

a. What is the annual cost savings expected to result from installation of the proposed JIT system?
b. Should the company install the system?

A18-6. The inventory investment will decline by $2.05 million × .40 = $820,000. This decline will save the company $820,000 × .14 = $114,800 per year. Subtracting the annual cost of $95,000 from the $114,800 annual savings results in net annual savings of $19,800. The company should install the system.

P18-7. Sheth & Sons Inc. is considering changing its pay period for its salaried management from paying salaries every two weeks to paying salaries monthly. The company's CFO, Ken Smart, believes that such action will free up cash that can be used elsewhere in the business, which currently faces a cash crunch. In order to avoid a strong negative response from the salaried managers, the company will simultaneously announce a new health plan that will lower managers' cost contributions without cutting benefits.

Ken's analysis indicates that the salaried managers' bimonthly payroll is $1.8 million and is expected to remain at that level for the foreseeable future. With the bimonthly system, there were 2.2 pay periods in a month. Because the managers will be paid monthly, the monthly payroll will be about $4.0 million (2.2 × $1.8 million). The annual cost to the company of the new health plan will be $180,000. Ken believes that because managers' salaries accrue at a constant rate over the pay period, the average salaries over the period can be estimated by dividing the total amount by 2. The company believes that it can earn 15% annually on any funds made available through the accrual of the managers' salaries.

a. How much additional financing will Sheth & Sons obtain as a result of switching the pay period for managers' salaries from every two weeks to monthly?
b. Should the company implement the proposed change in pay periods?

A18-7. a. The average amounts of financing provided are:

Pay Period	**Payroll**	**Average Amount of Financing**	
Monthly	$4,000,000	$4,000,000/2 =	$2,000,000
Every 2 weeks	$1,800,000	$1,800,000/2 =	900,000
	Additional financing provided		$1,100,000

b.

Earnings on additional financing invested = .15 × $1,100,000 =	$165,000
– Cost of new health plan	180,000
Net loss from proposal	$ -15,000

No, the company should not change the pay period as proposed because the annual return on the additional financing of $165,000 is less than the $180,000 annual cost of the new health plan. A net loss of $15,000 would result from implementing the proposal.

Inventory Management

P18-8. Calculate the average investment in inventory for each of the following situations. Assume a 365-day year.

a. A company's annual sales were $18 million, its gross profit margin was 32%, and its average age of inventory is 45 days.
b. A company's annual sales were $325 million, its cost of goods sold are 80% of sales, and it turns its inventory 10 times per year.
c. A company's annual cost of goods sold total $120 million, and it turns its inventory about every 70 days.

A18-8. a. Average investment in inventory = COGS/Inventory turnover
Inventory turnover = Sales/Inventory
Sales = $18,000,000
Gross profit margin = 32%, so COGS are 68% of sales
COGS = 0.68 × 18,000,000 = $12,240,000
Average age of inventory = Inventory/Sales per day
45 = Inventory/(18,000,000/365)
Inventory = $2,219,178
Average investment in inventory = 12,240,000/(18,000,000/2,219,178) = $1,509,041

b. Average investment in inventory = 260,000,000/10 = 26,000,000

c. Average investment in inventory = 120,000,000 × 70/365 = $23,013,699

P18-9. GEP Manufacturing is mulling over a plan to rent a proprietary inventory control system at an annual cost of $4.5 million. The company predicts its sales will remain relatively stable at $585 million and its gross profit margin will continue to be 28%. GEP expects that as a result of the new inventory control system, its average age of inventory (AAI) will drop from its current level of 83 days to about 46 days. The company's required return on similar-risk investments is 12%. Assume a 365-day year.

a. Calculate GEP's average inventory investment both (1) currently and (2) assuming it rents the inventory control system.
b. Use your findings in part (a) to determine the annual savings expected to result from the proposed inventory control system.
c. Based on your finding in part (b), would you recommend that GEP rent the inventory control system? Explain your recommendation.

A18-9. a. COGS = 1–0.28 = 0.72 of sales
COGS = 0.72 × $585,000,000 = $421,200,000
Average inventory investment (current) = $421,200,000 × 83/365 = $95,779,726
Average inventory investment (proposed) = $421,200,000 × 46/365 = $53,082,740

b. Annual savings = ($95,779,726 – $53,082,740) × 0.12 = $5,123,638

c. GEP should rent the system because the annual savings are greater than the annual cost.

P18-10. Iverson Industries uses 80,000 units of an 'A' item of raw material inventory each year. The company maintains level production throughout the year, given the steady demand for its finished products. The raw material order cost is $225 per order and carrying costs are estimated to be $10.50 per unit per year. The company wants to maintain a safety stock of 10 days of inventory, and it takes 5 days for the company to receive an order once it is placed. Assume a 365-day year.

a. Calculate the economic order quantity (EOQ) for Iverson's raw material.

b. How large a *safety stock* (in units) of inventory should the company maintain?
c. What is Iverson's *reorder point* for this item of inventory? (*Hint*: Be sure to include the safety stock.)

A18-10. a. EOQ = $\sqrt{\frac{2SO}{C}} = \sqrt{\frac{2 \times 80{,}000 \times \$225}{\$10.5}}$ = 1,851.64 units

b. Safety stock = 10/365 × 80,000 = 2,191.78

c. Reorder point = (lead time × daily usage) + safety stock
= (5 × 80,000)/365 + 2,191.78
= 3,287.67

P18-11. Litespeed Products from New Zealand buys 200,000 motors per year from a supplier that can fulfil orders within two days of receiving them. Litespeed transmits its orders to this supplier electronically so the lead time to receive orders is two days. Litespeed's order cost is about $295 per order and its carrying cost is about $37 per motor per year. The company maintains a safety stock of motors equal to six days usage. Assume a 365-day year.
a. What is Litespeed's economic order quantity (EOQ) for the motors?
b. How large a *safety stock* (in units) of motors should Litespeed maintain?
c. What is Litespeed's *reorder point* for motors? (*Hint*: Be sure to include the safety stock.)
d. If Litespeed has an opportunity to reduce either its order cost or its carrying cost by 10%, which of these would result in the lowest *total cost* at the associated new EOQ?

A18-11. a. EOQ = $\sqrt{\frac{2SO}{C}} = \sqrt{\frac{2 \times 200{,}000 \times \$295}{\$37}}$ = 1,786 units

b. Safety stock = 6/365 × 200,000 = 3,288

c. Reorder point = lead time × daily usage + safety stock
= (2 × 200,000/365) + 3,288 = 4,384

d. If order costs decrease by 10%, new order cost = $295 (1 – .10) = $265.50

New EOQ = $\sqrt{\frac{2SO}{C}} = \sqrt{\frac{2 \times 200{,}000 \times \$265.50}{\$37}}$ = 1,694 units

New total cost = $265.50 × 200,000/1694 + 37 × 1694/2 = $62,685

If carrying costs decrease by 10%, new carrying cost = $37 (1 – .10) = $33.30

New EOQ = $\sqrt{\frac{2SO}{C}} = \sqrt{\frac{2 \times 200{,}000 \times \$295}{\$33.30}}$ = 1,882 units

New total cost = $295 × 200,000/1,882 + 33.3 × 1,882/2 = $62,685

Both changes provide about the same total cost.

Accounts Receivable Standards and Terms

P18-12. International Oil Company (IOC) uses credit scoring to evaluate gasoline credit card applications. The following table presents the financial and credit characteristics considered and weights (indicating the relative importance of each characteristic) used in the credit decision. The company's credit standards are to accept all applicants with credit scores of 80 or higher, to extend limited credit on a probationary basis to applicants with scores higher than 70 and lower than 80, and to reject all applicants with scores below 70.

Financial and Credit Characteristics	Predetermined Weight
Credit references	.25
Education	.10
Home ownership	.10
Income range	.15
Payment history	.30
Years on job	.10

The company needs to process three applications that were recently received and scored by one of its credit analysts. The scores for each of the applicants on each of the financial and credit characteristics are summarised in the following table.

Financial and Credit Characteristics	Applicant's Scores (0-100)		
	X	Y	Z
Credit references	60	90	80
Education	75	80	80
Home ownership	100	90	60
Income range	70	70	80
Payment history	60	85	70
Years on job	50	60	90

a. Use the data presented to find the credit score for each of the applicants.
b. Recommend the appropriate action that the company should take for each of the three applicants.

A18-12. a.

	Scores			Weighted Scores		
Characteristic	**X**	**Y**	**Z**	**X**	**Y**	**Z**
References (.25)	60	90	80	15	22.5	20
Education (.10)	75	80	80	7.5	8	8
Home (.10)	100	90	60	10	9	6
Income (.15)	70	70	80	10.5	10.5	12
History (.30)	60	85	70	18	25.5	21
On job (.10)	50	60	90	5	6	9
Score				66	81.5	76

b. Applicant X should be rejected (<70), Applicant Y accepted (>80), and Applicant Z accepted on a probationary basis (between 70 and 80).

P18-13. Barans Company currently has an average collection period of 55 days and annual sales of $1 billion. Assume a 365-day year.
a. What is the company's average accounts receivable balance?
b. If the variable cost of each product is 65% of sales, what is the *average investment in accounts receivable?*
c. If the equal-risk opportunity cost of the investment in accounts receivable is 12%, what is the total annual cost of the resources invested in accounts receivable?

A18-13. a. The company's average receivables balance is $1,000,000,000 × 55/365 = $150,684,932.

b. The total variable cost is $1,000,000,000 × .65 x 55/365 = $97,945,205

c. The annual cost is .12 × $97,945,205 = $11,753,425

P18-14. Melton Electronics currently has an average collection period of 35 days and annual sales of $72 million. Assume a 365-day year.

a. What is the company's average accounts receivable balance?
b. If the variable cost of each product is 70% of sales, what is the company's *average investment in accounts receivable?*
c. If the equal-risk opportunity cost of the investment in accounts receivable is 16%, what is the total annual cost of the resources invested in accounts receivable?
d. Suppose that Melton can shorten the average collection period to 30 days by offering a cash discount of 1% for early payment, and 60% of the customers take this discount. Should the company offer this discount? Assume that its cost of bad debts will rise by $150,000 per year.

A18-14. a. The company's average receivables balance is $72,000,000 × 35/365 = $6,904,110

b. The total average investment in receivables is $72,000,000 × .70 × 35/365 = $4,832,877

c. The total annual cost of the investment in accounts receivable is .18 × $4,832,877 = $773,260

d. If the company offers a cash discount of 1% and 60% of customers take the discount, it will lose collections of $72,000,000 × .01 × .60 = $432,000. By shortening the average collection period to 30 days the company will free up 5 days of receivables (35 to 30 days) balance. Annual savings on this reduction would be .16 × $72,000,000 × .70 × 5/365 = $110,466, which is not enough to offset the loss in collections and the increase in bad debts.

P18-15. Davis Manufacturing Industries (DMI) produces and sells 20,000 units of a machine tool each year. All sales are on credit, and DMI charges all customers $500 per unit. Variable costs are $350 per unit, and the company incurs $2 million in fixed costs each year.

DMI's top managers are evaluating a proposal from the company's CFO that the company relax its credit standards to increase its sales and profits. The CFO believes this change will increase unit sales by 4%. Currently, DMI's average collection period is 40 days, and the CFO expects this to increase to 60 days under the new policy. Bad debt expense is also expected to increase from 1 to 2.5% of annual sales. The company's board of directors has set a required return of 15% on investments with this level of risk. Assume a 365-day year.

a. What is DMI's *contribution margin?* By how much will profits from increased sales change if DMI adopts the new credit standards?
b. Under the current credit standards, what is DMI's *average investment in accounts receivable*? What would it be under the proposed credit standards? What is the cost of this additional investment?
c. What is DMI's *cost of marginal bad debts* resulting from the relaxation of its credit standards?
d. What is DMI's net profit (or loss) from adopting the new credit standards? Should DMI relax its credit standards?

A18-15. a. Contribution margin = ($500 – $350) = $150 per unit
Old number of units produced: 20,000
New units = 20,000 × 1.04 = 20,800
Difference (Δ sales) = 800 units

Marginal profit from increased sales = ΔSales × (CM) = ΔSales × (Price – Variable Cost)

= 800 units × ($500 – $350)
= $120,000

b. Average investment in accounts receivable under current credit standards:
Total variable cost of annual sales/Turnover of accounts receivable

(20,000 × $350)/(365/40) = $7,000,000/9.125 = $767,123

Average investment in accounts receivable under proposed credit standards:

(20,800 × $350)/(365/60) = $7,280,000/6.0833 = $1,196,712

Additional investment: $1,196,712 – $767,123 = $429,589

Cost = .15 × $429,589 = $64,438

c. Bad debt expense = Sales × Bad debt expense rate = $500 × 20,000 × .01 = $100,000

New bad debt expense = $500 × 20,800 × .025 = $260,000

Cost of marginal bad debts = $260,000 – $100,000 = $160,000

d. The company's profit from the additional sales is less than the sum of its cost of additional investment in accounts receivable and its additional bad debt expense. A net loss of $104,438 would result from the proposed relaxation of credit standards. The company should not relax its credit standards.

P18-16. Jeans Manufacturing thinks that it can reduce its high credit costs by tightening its credit standards. However, as a result of the planned tightening, the company believes its annual sales will drop from $38 million to $36 million. On the positive side, the company expects its average collection period to fall from 58 to 45 days and its bad debts to drop from 2.5 to 1% of sales. The company's variable cost per unit is 70% at its sale price, and its required return on investment is 15%. Assume a 365-day year. Evaluate the proposed tightening of credit standards, and make a recommendation to the management of Jeans Manufacturing.

A18-16. Marginal profit from new sales:
Sales decline: $38,000,000 – $36,000,000 = $2,000,000
Lost profits = $2,000,000 × (1 – 0.70) = $600,000

Average investment in accounts receivable under current standards:
$38,000,000 × 0.70/(365/58) = $26,600,000/6.2931 = $4,226,849

Under new policy:
$36,000,000 × 0.70/(365/45) = $25,200,000/8.1111 = $3,106,849

Reduction in A/R investment: $4,226,849 – $3,106,849 = $1,120,000
Savings from reduced A/R investment: $1,120,000 × 0.15 = $168,000

Bad debt expense = Sales × bad debt expense rate
Old credit standards:
$38,000,000 × 0.025 = $950,000

New credit standards:
$36,000,000 × 0.01 = $360,000

Reduced bad debt cost: $950,000 – $360,000 = $590,000

Total savings: $590,000 + $168,000 = $758,000

The savings of $758,000 are greater than the $600,000 of lost profits from the sales decline. The company should make the change, which should result in a net profit of $758,000 – $600,000 = $158,000.

P18-17. Webb Pty Ltd currently makes all sales on credit and offers no cash discounts. The company is considering offering a 2% cash discount for payments within 10 days. The company's current average collection period is 65 days, sales are 400,000 units, selling price is $50 per unit, and variable cost per unit is $40. The company expects that the changes in credit terms will result in an increase in sales to 410,000 units, that 75% of the sales will take the discount, and that the average collection period will fall to 45 days. Bad debts are expected to drop from 1.0 to 0.9% of sales. If Webb's required rate of return on investments of similar risk is 25%, should the company offer the proposed discount? Assume a 365-day year.

A18-17. Marginal profit from new sales:

Current number of units sold: 400,000
Number of units sold after initiating cash discount: 410,000
Increase in unit sales (Δ sales) = 410,000 – 400,000 = 10,000 units

Marginal profit from increased sales = Δ Sales × Contribution Margin (CM)
= Δ Sales × (Price – VC)
= 10,000 units × ($50 – $40)
= $100,000

Cost of the cash discount: 0.02 × 410,000 units × $50 × 0.75 = $307,500

Average investment in accounts receivable under current credit terms:
Total variable cost of annual sales/Turnover of accounts receivable

(400,000 × $40) / (365/65) = $16,000,000/5.61538 = $2,849,315

Average investment in accounts receivable with proposed cash discount:
(410,000 × $40) / (365/45) = $16,400,000/8.11111 = $2,021,918

Reduced investment in accounts receivable: $2.849,315 – $2,021,918 = $827,397
Annual savings from reduced A/R investment: 0.25 × $827,397 = $206,849

Current bad debt expense = 400,000 × $50 × .01 = $200,000
Bad debt expense with cash discount = 410,000 × $50 × .009 = $184,500
Savings from reduced bad debt expense: $200,000 – $184,500 = $15,500

Net profit from offering cash discount: $100,000 – $307,500 + $206,849 + $15,500 = $14,849

Institution of the proposed cash discount will increase the company's net profit by $14,849 and therefore is recommended.

P18-18. Microboard, a major Chinese computer chip manufacturer, is thinking of lengthening its credit period from net 30 days to net 50 days. Presently, its average collection period is 40 days, and the company's CFO believes that with the proposed new credit period, the average collection period will be 65 days. The company's sales are $900 million, and the CFO believes that with the new credit terms, sales will increase to $980 million. At the current $900 million sales level, the company's total variable costs are $630 million. The company's CFO estimates that with the proposed new credit terms, bad debt expenses will increase from the current level of 1.5% of sales to 2.0% of sales. The CFO also believes that the increased sales volume and accompanying receivables will require the company to add more facilities and personnel to its credit and collections department. The annual cost of the expanded credit operations resulting from the proposed new credit period is estimated to be $10 million. The company's required return on similar-risk investments is 18%. Assume a 365-day year. Evaluate the economics of

Microboard's proposed credit-period lengthening, and make a recommendation to the company's management.

A18-18. Current sales: $900,000,000

Current variable costs: $630,000,000

Per cent of variable costs to sales: $630/$900 = 70%

Current profit contribution: $900,000,000 – $630,000,000 = $270,000,000

Sales with lengthened credit period: $980,000,000

Costs with lengthened credit period: 0.70 × $980,000,000 = $686,000,000

Profit contribution from lengthened credit period:
$980,000,000 – $686,000,000 = $294,000,000

Marginal profits from credit period lengthening: $294,000,000 – $270,000,000 = $24,000,000

Average investment in accounts receivable under current credit terms:
Total variable cost of annual sales/Turnover of accounts receivable
$630,000,000/(365/40) = $630,000,000/9.125 = $69,041,096

Average investment in accounts receivable with lengthened credit period:
$686,000,000 / (365/65) = $686,000,000/5.615385 = $122,164,384

Increased investment in accounts receivable: $122,164,384 – 69,041,096 = $53,123,288
Cost of increased A/R investment = 0.18 × $53,123,288 = $9,562,192

Current bad debt expense = 0.015 × $900,000,000 = $13,500,000
Bad debt expense with lengthened credit period = 0.02 × $980,000,000 = $19,600,000
Cost of increased bad debt expense: $19,600,000 – $13,500,000 = $6,100,000

Cost/Benefit Summary	
Increased profit contribution:	$24,000,000
Less: Increased costs:	
Cost of increased A/R investment	$ 9,562,192
Cost of increased bad debt expense	6,100,000
Cost of expanded operation	10,000,000
Total cost increase	$25,662,192
Net loss from credit period lengthening	$–1,662,192

Because the proposed credit period lengthening would result in a net loss of $1,662,192, the company should not lengthen the credit period as proposed.

Collecting, Monitoring, and Applying Cash to Receivables

P18-19. United Worldwide's accounts receivable totalled $1.75 million on 31 August 2012. The table below gives a breakdown of these outstanding accounts on the basis of the month of the initial credit sale. The company extends net 30, EOM to its credit customers.

Month of Credit Sale	Accounts Receivable
August 2012	$ 640,000
July 2012	500,000
June 2012	164,000
May 2012	390,000
April 2012	56,000
Total (31 August 2012)	$1,750,000

a. Prepare an ageing schedule for United Worldwide's 31 August 2012, accounts receivable balance.
b. Using your findings in part (a), evaluate the company's credit and collection activities.
c. What are some probable causes of the situation discussed in part (b)?

A18-19. a.

Month of Sale	Age of Accounts	Accounts Receivable	Percentage of A/R
Aug 2012	0-30 days	640,000	36.6%
July 2012	31-60 days	500,000	28.6%
June 2012	61-90 days	164,000	9.3%
May 2012	91-120 days	390,000	22.3%
April 2012	121+ days	56,000	3.2%
	Total A/R	$1,750,000	100.0%

b. The company has a large percentage of uncollected accounts that are 90–120 days old, resulting from sales made in May 2012.
c. The high percentage of May 2012 uncollected accounts could be attributable to large disputed account, the hiring of a new credit manager, the insolvency of a major customer, and so on.

P18-20. Big Air Board Company, an Australian manufacturer and distributor of both surfboards and snowboards, is in a very seasonal business. Although surfboard sales are only mildly seasonal, the snowboard sales are driven by peak demand in the first and fourth calendar quarters of each year. We are presently in early July 2013. The following table gives the company's monthly sales for the immediate past quarter (April to June 2013) and its forecast monthly sales for the coming year (year 2013-14).

Month	Sales ($ in millions)
Historic	
April 2013	$3.7
May 2013	3.9
June 2013	4.3
Forecast	
July 2013	3.8
August 2013	2.6
September 2013	2.2
October 2013	1.6
November 2013	1.8
December 2013	1.9
January 2014	2.0
February 2014	2.2
March 2014	2.4
April 2014	4.1

May 2014	4.6
June 2014	5.1

The company extends 2/10 net 30, EOM credit terms to all customers. It collects 98% of its receivables; the other 2% is typically written off as bad debts. Big Air Board's historic collection pattern, which is expected to continue through 2013-14, is 5% collected in the month of the sale, 65% collected in the first month following the sale, and 28% collected in the second month following the sale. Using the data given, calculate the payment pattern of Big Air Board's accounts receivable. Comment on the company's monthly collections during calendar year 2013-14.

A18-20.

Month	Sales	Collected	April	May	June	July	August
Apr-13	$3,700,000	$3,626,000	$185,000	$2,405,000	$1,036,000		
May-13	3,900,000	3,822,000		195,000	2,535,000	$1,092,000	
Jun-13	4,300,000	4,214,000			215,000	2,795,000	$1,204,000
Jul-13	3,800,000	3,724,000				190,000	2,470,000
Aug-13	2,600,000	2,548,000					130,000
Sep-13	2,200,000	2,156,000					
Oct-13	1,600,000	1,568,000					
Nov-13	1,800,000	1,764,000					
Dec-13	1,900,000	1,862,000					
Jan-14	2,000,000	1,960,000					
Feb-14	2,200,000	2,156,000					
Mar-14	2,400,000	2,352,000					
Apr-14	4,100,000	4,018,000					
May-14	4,600,000	4,508,000					
Jun-14	5,100,000	4,998,000					
			Total		$3,786,000	$4,077,000	$3,804,000

Month	Sales	Collected	September	October	November	December	January
Apr-13	$3,700,000	$3,626,000					
May-13	3,900,000	3,822,000					
Jun-13	4,300,000	4,214,000					
Jul-13	3,800,000	3,724,000	$1,064,000				
Aug-13	2,600,000	2,548,000	1,690,000	$ 728,000			
Sep-13	2,200,000	2,156,000	110,000	1,430,000	$ 616,000		
Oct-13	1,600,000	1,568,000		80,000	1,040,000	$ 448,000	
Nov-13	1,800,000	1,764,000			90,000	1,170,000	$ 504,000
Dec-13	1,900,000	1,862,000				95,000	1,235,000
Jan-14	2,000,000	1,960,000					100,000
Feb-14	2,200,000	2,156,000					
Mar-14	2,400,000	2,352,000					
Apr-14	4,100,000	4,018,000					
May-14	4,600,000	4,508,000					
Jun-14	5,100,000	4,998,000					
			$2,864,000	$2,238,000	$1,746,000	$1,713,000	$1,839,000

Month	Sales	Collected	February	March	April	May	June
Apr-13	$3,700,000	$3,626,000					
May-13	3,900,000	3,822,000					
Jun-13	4,300,000	4,214,000					
Jul-13	3,800,000	3,724,000					
Aug-13	2,600,000	2,548,000					
Sep-13	2,200,000	2,156,000					
Oct-13	1,600,000	1,568,000					
Nov-13	1,800,000	1,764,000					
Dec-13	1,900,000	1,862,000	$ 532,000				
Jan-14	2,000,000	1,960,000	1,300,000	$ 560,000			
Feb-14	2,200,000	2,156,000	110,000	1,430,000	$ 616,000		
Mar-14	2,400,000	2,352,000		120,000	1,560,000	$ 672,000	
Apr-14	4,100,000	4,018,000			205,000	2,665,000	$1,148,000
May-14	4,600,000	4,508,000				230,000	2,990,000
Jun-14	5,100,000	4,998,000					255,000
			$1,942,000	$2,110,000	$2,381,000	$3,567,000	$4,393,000

The company's collections are high at the middle of the year, then decline slowly until the the first quarter of the next year, when sales begin to increase and drive the second quarter collections up.

Answer to MiniCase

Cash Conversion, Inventory, and Receivables Management
Upon graduation you receive a job offer from Pronto Manufacturing. Duties listed with this job position include responsibilities in implementing the policy and management of cash conversion, inventory, and receivables. To get ready for the start of this job you decide to review the following topics.

Assignment
1. What is the cash conversion cycle and what is the difference between it and the operating cycle?
2. What are some ways of shortening the cash conversion cycle?
3. Discuss techniques for controlling inventory.
4. What aspects must managers consider when deciding on a trade credit policy for the company?
5. Describe the five Cs of credit.
6. What factors should managers consider when determining the company's collection policy?

Answers
1. The cash conversion cycle is the elapsed time between the points at which a company pays for raw materials and at which it receives payment for finished good. The difference between the operating cycle and the cash conversion cycle is simply the amount of time that suppliers are willing to extend credit. In other words, to calculate the cash conversion cycle, start with the operating cycle and then subtract the average payment period (APP) on accounts payable.

2. Managers can shorten the cash conversion cycle by (a) turning over inventory as quickly as possible without stockouts that will result in lost sales, (b) collect accounts receivable as quickly as possible without losing sales from high-pressure collection techniques, (c) pay accounts as slowly as possible without damaging the company's credit rating, and (d) manage mail, processing, and clearing time to reduce them when collecting from customers and increase them when paying vendors.

3. Techniques for controlling inventory include: (a) the ABC System, (b) the EOQ Model, (c) Safety Stocks and Reorder Points, (d) Materials Requirement Planning, and (e) Just-in-Time Systems. A company using the ABC system segregates its inventory into three groups, A, B, and C. The A group contains items requiring the largest dollar investment, and therefore, control of the A items should be most intensive due to the high dollar investments involved, whereas the B and C items would be subject to correspondingly less sophisticated procedures. The economic order quantity (EOQ) model considers operating and financial costs and determines the order quantity that minimises overall inventory costs. The safety stocks and reorder points method starts with the simple EOQ model, but provides a method to overcome the assumption that inventory is instantaneously replenished with the receipt of a new order precisely at the time the inventory is exhausted. Therefore, to allow for faster-than-anticipated rates of usage and delayed deliveries, many companies maintain safety stocks of inventory with reorder points. Material requirements planning (MRP) uses a master schedule to ensure that the materials, labor, and equipment needed for production are at the right places in the right amounts at the right times. The schedule is based on forecasts of the demand for the company's products. A just-in-time (JIT) system is based on the belief that materials should arrive exactly when they are needed for production, rather than being stored on sight. Relying closely on computerised systems such as MRP and MRPII, manufacturers determine what parts will be needed and when, and then order them from suppliers so they arrive 'just in time.'

4. The first decision a company must make is whether it will offer trade credit at all. There are many reasons for offering credit, including increasing or facilitating sales, meeting terms offered by competitors, attracting new customers, or providing general convenience. In a typical business-to-business environment, a company may have to offer trade credit just to generate sales. Once the decision has been made to offer trade credit, a company must then (1) determine its credit standards (Who gets offered credit and how much?), (2) set its credit terms (How long do customers have to pay, and are any discounts offered for early payment?), (3) develop its collection policy (How should delinquent accounts be handled?), and (4) monitor its accounts receivable on both an individual and aggregate basis (What is the status of each customer and the overall quality of its receivables?).

5. The five Cs are (1) Character, (2) Capacity, (3) Capital, (4) Collateral, and (5) Conditions. Character refers to the applicant's record of meeting past obligations. The lender would consider the applicant's past payment history, as well as any pending or resolved legal judgments against the applicant. The question addressed here is whether this applicant will pay its account, if able, within the specified credit terms. Capacity is the applicant's ability to repay the requested credit. The lender typically assesses the applicant's capacity by using financial statement analysis focused on cash flows available to service debt obligations. Capital refers to the financial strength of the applicant as reflected by its capital structure. The lender frequently uses analysis of the applicant's debt relative to equity and its profitability ratios to assess its capital. The analysis of capital determines if the applicant has sufficient equity to survive a business downturn. Collateral is the assets the applicant has available for use in securing the credit. In general, the more valuable and more marketable these assets are, the more credit lenders will extend. However, trade credits are rarely secured loans. Therefore, collateral is not the primary consideration in deciding to grant credit but serves to strengthen the creditworthiness of a customer that appears to have sufficient cash flows to meet its obligation. Conditions refer to current general and industry-specific economic conditions. It also considers any unique conditions surrounding a specific transaction. For example, a company that has excess inventory of a given item may be willing to accept a lower price or extend more attractive credit terms in order to sell the item.

6. The approach to collections may be a function of the industry and the competitive environment. For many delinquent accounts, a reminder, form letter, telephone call, or visit may facilitate customer payment. At a minimum, the company should generally suspend further sales until the delinquent account is brought current. When these actions fail to generate customer payment, it may be

necessary to negotiate with the customer for past-due amounts and report the customer to credit bureaus. It is possible that the goods were sold with a lien attached, collateral pledged against the account, or additional corporate or personal guarantees given. In these cases, the company should utilise these options for obtaining payment. Generally as a last resort, the account can be turned over to a collection agency or referred to an attorney for direct legal action.