

Financial Accounting for Radiology Executives

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The authors review the role of financial accounting information from the perspective of a radiology executive. They begin by introducing the role of pro forma statements. They discuss the fundamental concepts of accounting, including the matching principle and accrual accounting. The authors then explore the use of financial accounting information in making investment decisions in diagnostic medical imaging. The paper focuses on critically evaluating the benefits and limitations of financial accounting for decision making in a radiology practice.

Key Words: Balance sheet, income statement, financial accounting, revenue, cash, investment, management

J Am Coll Radiol 2005;2:232-240. Copyright © 2005 American College of Radiology

INTRODUCTION

Financial accounting can be defined as the process of identifying, measuring, classifying, accumulating, summarizing, and communicating information about economic entities that is primarily quantitative and is useful to decision makers. (For more on the scope of financial accounting, including equivalent definitions, see any of the suggested reading material listed under "Additional Reading.") In this paper, we discuss the key principles of financial accounting and the four statements most commonly used in managing a radiology practice. We also discuss the proper role of accounting information in capital investment decisions.

THE CHANGING MARKETPLACE

Much of the recent growth in diagnostic imaging is a result of medical advances that allow physicians to better diagnose disease in a noninvasive manner. Yet despite the growth in aggregate demand, competition in the medical imaging business has intensified because of expansion of many existing facilities and the introduction of nontraditional professionals into the field, primarily cardiologists, orthopedic surgeons, and gynecologists. In addition to handling the challenges of increased competition, radiology executives also must deal with significant capital expenses for equipment upgrades and replacements

and a tight labor market for radiologists, technologists, and well-qualified support staff members.

Both quantitative and qualitative information can be useful for making decisions. Indeed, at times, qualitative information may be more important. For example, understanding the changing pattern of referral preferences by orthopedic surgeons in a region may be of crucial importance for forecasting future revenues. Quantitative information can be more important in other cases; knowledge of the past profitability of a radiology practice is fundamental to an evaluation of its executives' performance.

What, then, is accounting information, and what makes it different? Accounting information is designed to be used in making financial decisions. It is primarily quantitative in nature, and it relates monetary information to a specific entity. Senior management and outside investors rely on the information provided by a firm's financial accounting system. They want to project future cash flows, revenues, or profits and use that information when evaluating the performance of the radiology practice's executives or assessing the feasibility of granting a requested line of credit.

Owners and executives can use radiology accounting information to make critical decisions regarding various aspects of a business:

- the allocation of resources (hiring an additional technologist, purchasing a new or used magnet),
- methods of funding (using one's own money only, borrowing, or taking on a partner),
- the level of operations (staying open later at night, increasing the number of computed tomography scanners, opening a second site),

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Dr Watts Radiology Services Inc. Balance Sheet 8-Jan-04	
<u>Assets</u>	<u>Liabilities & Owners' Equity</u>
What do we have?	Where did we get it from?

Fig. 1. Basic structure of a balance sheet.

- methods of operation (accepting discounted contracts, providing custom reports), and
- pricing (determining a fee structure to cover the added expenses of special procedures).

MAKING AN INVESTMENT DECISION

Consider the following decision problem. Edmonds Medical Imaging, Inc. (EMI), wants to get and operate a new 3-T facility. In the next few sections, we present the necessary factors in this important decision. Investment decisions rely on information from more than one financial accounting report. This information forms the basis for properly assessing the expected profitability of the various investment options.

Investment decisions use both past data and “best estimates” of future financial performance. These estimates are contained in pro forma statements. Pro forma statements offer a prediction of the financial statements if certain future conditions prevail. They include historical patterns such as patient volume, labor wages, or material cost. They are used to estimate the impact on rates of return, cash position, or profitability when a trend continues into the future or when the firm expects to change its operations (by adding a new modality or opening a new center). Typically, radiology pro forma studies look 3 to 5 years into the future. Developing a pro forma statement requires users to project the following six items:

1. operating revenues;
2. operating expenses given the projected level of revenues;
3. assets required to support these revenues;
4. the financing required to fund the level of assets in item 3 above;
5. the costs of debt financing, taxes, net income, and changes in retained earnings; and
6. the cash flow statement.

Estimating these six items will result in a well-designed

pro forma statement that can be used effectively to plan the future of a radiology practice.

Pro forma statements are useful in any context involving investments. For example, owners of a radiology practice facing a growing demand must think about ways to accommodate it. The first question is whether they want more volume. If the answer is positive, then they must decide what kind of capacity expansion is needed to ensure the proper level of service. These are the operations decisions. Once the expected volume has been determined, what kind of additional equipment has to be installed? Are there any other modifications needed to the existing facility or the information technology infrastructure? These are the investment decisions. The next step in the decision-making process involves the financing decisions: how will the practice fund that capacity expansion? Will the practice buy, lease, or rent the equipment and use accumulated capital or debt equity in financing the remodeling of their building? The four basic financial statements discussed below are used for reporting historical results. A similar structure is used in constructing the pro forma statements that provide a picture of the future financial conditions of the practice if events happen according to the plan. These pro forma statements can help, for instance, in making the financing decisions by identifying the cash flows from clinical operations, capital investments, and financial transactions. They can indicate when the practice may run out of cash and will need to borrow, even though it may be profitable at that time.

FINANCIAL ACCOUNTING STATEMENTS

To properly address these questions, we need information from the four basic financial statements:

- the balance sheet,
- the income statement,
- the statement of cash flows (the cash flow statement), and
- the statement of retained earnings.

These are integrated reports that feed information into one another. They describe the course of a practice’s operations over a period of time and the financial position of that practice at a specific point in time. We explore the information contained in these statements using a pair of example radiology practices. The first is a small practice established by Dr. Watts, who has started her practice using her own family savings and a bank loan. The second is a more mature firm, EMI, mentioned above.

A balance sheet (Fig. 1) presents a firm’s financial position, reporting the things of value the business owns (its assets) and what it owes (its liabilities). A balance

Dr Watts Radiology Services Inc. Balance Sheet 8-Jan-04			
<u>Assets</u>		<u>Liabilities & Owners' Equity</u>	
Cash	\$500,000	Bank loan	\$100,000
		Watts, capital	\$400,000
Total	\$500,000	Total	\$500,000

Fig. 2. Balance sheet just after startup.

sheet also reports the owners' financial interest in the enterprise at a particular point. As seen in Fig. 1, corporate assets are presented on the left side, with liabilities and owners' equity on the right. The "balance" of the balance sheet is evident in this equation:

$$\text{Assets} = \text{Liabilities} + \text{Owner's Equity}.$$

Every change in the current entities on the balance sheet must be recorded in two places or more. For instance, consider the starting balance sheet of Dr. Watts's practice.

She has used \$400,000 from her own family savings and a \$100,000 bank loan to establish the business. Her total assets, then, will be \$500,000, all in cash. The corresponding right side of the balance sheet (Fig. 2) shows the sources of these funds: \$100,000 provided as a bank loan (liability), and \$400,000 from Dr. Watts (owners' equity).

Over time, the balance sheet becomes more involved as additional transactions take place. Assume that on January 8, 2004, Dr. Watts bought supplies for \$50,000 in cash. Fig. 3 shows her balance sheet after this transaction has taken place. The total assets are still \$500,000, but the cash amount has decreased by \$50,000 used to

Dr Watts Radiology Services Inc. Balance Sheet 8-Jan-04			
<u>Assets</u>		<u>Liabilities & Owners' Equity</u>	
Cash	\$450,000	Bank loan	\$100,000
Medical supplies	\$50,000	Watts, capital	\$400,000
Total	\$500,000	Total	\$500,000

Fig. 3. Balance sheet after cash purchase of medical supplies.

Dr Watts Radiology Services Inc. Balance Sheet 9-Jan-04			
<u>Assets</u>		<u>Liabilities & Owners' Equity</u>	
Cash	\$450,000	Accounts payable	\$10,000
Medical supplies	\$50,000	Bank loan	\$100,000
Furniture	\$10,000	Watts, capital	\$400,000
Total	\$510,000	Total	\$510,000

Fig. 4. Balance sheet after furniture purchase on credit.

fund the purchase of medical supplies. There are no changes on the right-hand side.

A day later, on January 9, Dr. Watts bought furniture for \$10,000 on credit. In this case, recording the transaction involves both sides of the balance sheet. We see in Fig. 4 that the assets side has increased by \$10,000 for furniture. On the liabilities and owners' equity side, there is a new entry for the new liability, an account payable of \$10,000.

Entries in the balance sheet must follow the principle of matching. For each period, we must match income with relevant expenses. The matching process involves determining in which period specific benefits are received by the practice and then recognizing in that period both the benefits and the costs incurred to get the benefits. This allows a comparison between costs and benefits so that financial statement users can assess how successful the practice has been in incurring only costs that generate benefits in excess of those costs. For example, Dr. Watts bought film for 6 months in advance, but she writes as an expense every month only the amount of sheets she actually used that month. This procedure provides a much clearer sense of resources acquired, and used, for the revenues generated that month. Most radiology activities are aimed at acquiring one particular benefit, service revenue. Much of their accounting effort therefore involves determining when to recognize revenue and what costs are associated with the revenue recognized during the period.

In accordance with the matching principle, the recognition of revenues and expenses is done on an accrual basis: revenues are recorded when earned, and expenses are recorded when incurred, not necessarily when cash changes hands!

For example, the practice may buy and pay for large lots of films every 6 months. Yet according to the matching principle, the expense for the film is accrued (and recorded) only when the film is used.

A Edmonds Medical Imaging Inc. Pro Forma Balance Sheet (in \$1,000) 31-Dec-05			
	2002	2005	
Assets			
Cash	\$1,995	\$3,234	
Accounts receivables	\$7,395	\$10,454	
Medical supplies	<u>\$6,225</u>	<u>\$8,064</u>	
Current assets	\$15,615	\$21,752	
Radiology equipment	\$4,950	\$6,158	
Office furniture	\$560	\$586	
Computers	<u>\$1,650</u>	<u>\$1,402</u>	
Long term assets	\$7,160	\$8,146	
Total assets	<u>\$22,775</u>	<u>\$29,898</u>	

B Edmonds Medical Imaging Inc. Pro Forma Balance Sheet (in \$1,000) 31-Dec-05			
	2002	2005	
Liabilities			
Accounts payable	\$2,812	\$3,230	
Banks line of credit	\$1,213	\$1,728	
Accrued expenses and taxes	<u>\$3,498</u>	<u>\$4,056</u>	
Current liabilities	<u>\$7,523</u>	<u>\$9,014</u>	
Long-term debt	\$1,759	\$5,500	
Owners' equity			
Contributed capital	\$7,000	\$10,000	
Retained earnings	<u>\$6,493</u>	<u>\$5,384</u>	
	\$13,493	\$15,384	
Total	<u>\$22,775</u>	<u>\$29,898</u>	

Fig. 5. (A) Edmonds Medical Imaging balance sheet (assets) for 2002 and 2005. (B) Edmonds Medical Imaging balance sheet (liabilities and owners' equity) for 2002 and 2005.

In general, accrual accounting recognizes revenues when they are realized and earned. Realization is the process of converting noncash assets into cash or claims to cash. For revenues to be recognized, two conditions ordinarily must be met:

1. an exchange must take place, and
2. the earning process must be substantially complete.

In a typical patient study transaction, the radiology practice provides a diagnostic imaging service to a patient on the basis of the insurer's promise to pay a specific amount of cash in the future. The exchange provides evidence that two independent parties, the patient and the provider, have agreed on a value for the transaction, and this agreed value provides objective evidence for recognition in the accounts.

Not only must an exchange take place for revenues to be recognized, but the revenues also must be earned. In determining when revenues are earned, accountants typically use a "critical events" approach. For a radiology practice, the critical events occur when the patient has been studied, a diagnostic report has been signed, and the payer has been billed. Note that although the actual payment may come 75 days later, under the accrual system, the examination is recorded as income for the period in which the invoice was issued, so that the revenues are matched with the period in which the practice spent resources (labor and material) to conduct that study. We

consider these more complex questions using a different example firm, EMI.

Fig. 5 reveals some other important principles. We see that information is usually classified or grouped within the balance sheet. For example, rather than a random listing of account balances, all assets are grouped together, as are all liabilities. Within these categories, various subgroupings are usually provided to further facilitate the use of the information. Fig. 5a presents the assets side of the balance sheet. These are economic resources that are expected to increase future cash flows into the practice or reduce cash outflows. They are listed in order of liquidity, with the most liquid asset, current assets, on top. These are short-term assets to be used in the next 12 months. They may include cash, accounts receivable, or supplies. Below, we find the long-term assets. These are assets that will not be sold or consumed in the next 12 months and may include most of the medical equipment, the building, or land.

On the liabilities and owners' equity side (Fig. 5b), the liabilities (economic obligations to outsiders) are also sorted in terms of immediacy. The current liabilities include everything that is due within the next 12 months, such as accounts payable, wages payable, or short-term bank loans. The long-term liabilities are due beyond the next 12 months, such as long-term bank financing or mortgages. In general, companies also must report liabilities for the present value of pension and other benefits,

Edmonds Medical Imaging Inc. Pro Forma Income Statement (in \$1,000)		
	2002	2005
Revenues		
Professional services	\$30,820	\$41,458
Medical consultation	\$15,300	\$19,812
Interest income	\$2,370	\$3,748
Total revenues	\$48,490	\$65,018
Expenses		
Salaries/benefits	\$25,780	\$30,364
Professional services	\$8,188	\$12,860
Rent/leases	\$3,468	\$3,786
Depreciation	\$2,312	\$3,098
Legal/insurance/accounting	\$2,120	\$3,076
Interest	\$2,400	\$3,800
Supplies and other exp.	\$2,490	\$3,618
Total expenses	\$46,758	\$60,602
Income before taxes	\$1,732	\$4,416
Income taxes	\$704	\$2,080
Net income	\$1,028	\$2,336

Fig. 6. Edmonds Medical Imaging income statement for 2002 and 2005.

such as health insurance, to be paid to retired employees in the future on the basis of their service to date. Given longer life expectancies and increasing health care costs, these obligations may be especially significant and could impose severe burdens on many companies in the future. The last category, owners' equity, contains at least two important subcategories: contributed capital (investment by the owners) and retained earnings (profits not distributed as a dividend).

The next report, the income statement, shows what has been going on during a particular period. Income statements are typically produced on a monthly, quarterly, and annual basis. They measure the operating performance of the practice. As we see in Fig. 6, the various sources of revenues are presented at the top, followed by a classified list of expenses. The difference between the total revenues and total expenses is the income of the practice before taxes.

EMI's income statement (Fig. 6) presents the results of the company's operations. By comparing EMI's revenues with its operating costs for the year, the income statement provides a basis for evaluating the success of the company's activities. One measure of that success is the company's net income or net earnings, the excess of revenues over expenses. EMI reported net earnings of

\$1,028,000 in 2002 and expects to report a net income of \$2,336,000 in 2005.

It is important to note that the balance sheet represents a particular point in time, whereas the income statement captures the dynamics of the business over a given interval. In a sense, the reader of these financial reports goes from one balance sheet (say, for December 31, 2003), to an income statement (say, for 2004), and then to the next balance sheet (on, say, December 31, 2004).

The third financial accounting report, the statement of cash flow, is a summary of the activities in the "cash" account on the balance sheet over a given period. It uses information from both the balance sheet and the income statement. The statement of cash flows (1) explains the reasons for a change in cash; (2) classifies the reasons for the change as an operating, investing, or financing activity; and (3) reconciles net income with cash flows from operations. We see in Fig. 7 that EMI had an increase of \$1,986,000 in its cash balance. This was driven by \$2,336,000 as a contribution from net profit (from the income statement) and an additional \$3,098,000 of depreciation and amortization that acted as a tax shelter in the income statement. There was a cash decrement of \$5,200,000 due to investments by EMI and a cash increase in the amount of \$1,752,000 due to bank loan financing. We add the cash increase of \$1,986,000 to the previous cash balance (in the balance sheet) of \$1,248,000 and find that the new cash position (to be reported in the next balance sheet) is now \$3,234,000.

The fourth accounting report, the statement of retained earnings, provides a detailed summary of the retained earnings entry on the balance sheet during a given period. Retained earnings are the accumulated undistributed income. This amount accrues to the owners of the corporation, but has not been distributed to them. The statement of retained earnings may

Pro Forma Statement of Cash Flows Edmonds Medical Imaging Inc. (All in thousands of dollars)	
Net cash flow from operating activities ¹	\$ 2,336
Depreciation and amortization ¹	\$ 3,098
Net cash used by investing activities	\$ (5,200)
Net cash provided by financing activities	\$ 1,752
Increase in cash balance	\$ 1,986
Beginning cash balance (December 31, 2004) ²	\$ 1,248
Ending cash balance (December 31, 2005) ²	\$ 3,234

¹ Entries correspond to corresponding income statement
² Entries correspond to corresponding balance sheets

Fig. 7. Edmonds Medical Imaging statement of cash flows for 2005.

Pro Forma Statement of Retained Earnings Edmonds Medical Imaging Inc. (All in thousands of dollars)	
Beginning retained earnings balance (December 31, 2004)	\$ 3,528
Plus: net income	\$ 2,336
Less: dividends	\$ (480)
Ending retained earnings balance (December 31, 2005)	<u>\$ 5,384</u>

Fig. 8. Edmonds Medical Imaging statement of retained earnings for 2005.

be useful for external decision makers because it indicates the extent to which a company has been able to finance its growth internally through its profitable operations. In Fig. 8, we see that EMI expects to have \$3,528,000 in retained earnings on December 31, 2004. With an anticipated income of \$2,336,000 during 2005, and a dividend payout of \$480,000 in 2005, the forecasted ending retained earnings for December 31, 2005, stands at \$5,384,000.

These four financial statements are linked with each other, as Fig. 9 shows. In its most basic format, the

balance sheet of the previous year feeds the cash record into the beginning balance of the statement of cash flows for the following year. It also feeds the retained earnings record to the beginning balance of the statement of retained earnings in the following year. The income statement feeds the net income record into the net income entry of the statement of retained earnings for the following year. The balance sheet for the following year gets its cash record (on the assets side) from the ending balance in the statement of cash flows of the previous year, and the retained earnings record (on the liabilities and owners' equity side) from the ending balance entry in the statement of retained earnings for the previous year.

USING FINANCIAL ACCOUNTING INFORMATION IN RADIOLOGY INVESTMENTS

How can a radiology executive make use of the information contained in the four financial statements discussed above? Consider our example practice, EMI, which wants to open a new 3-T facility with an initial investment of \$2,400,000. The 3-T equipment has an expected useful life of 4 years; the accounting system assumes linear depreciation, with a marginal tax rate of 34%. To decide whether to proceed with the investment, EMI's managers or investors need to calculate the net

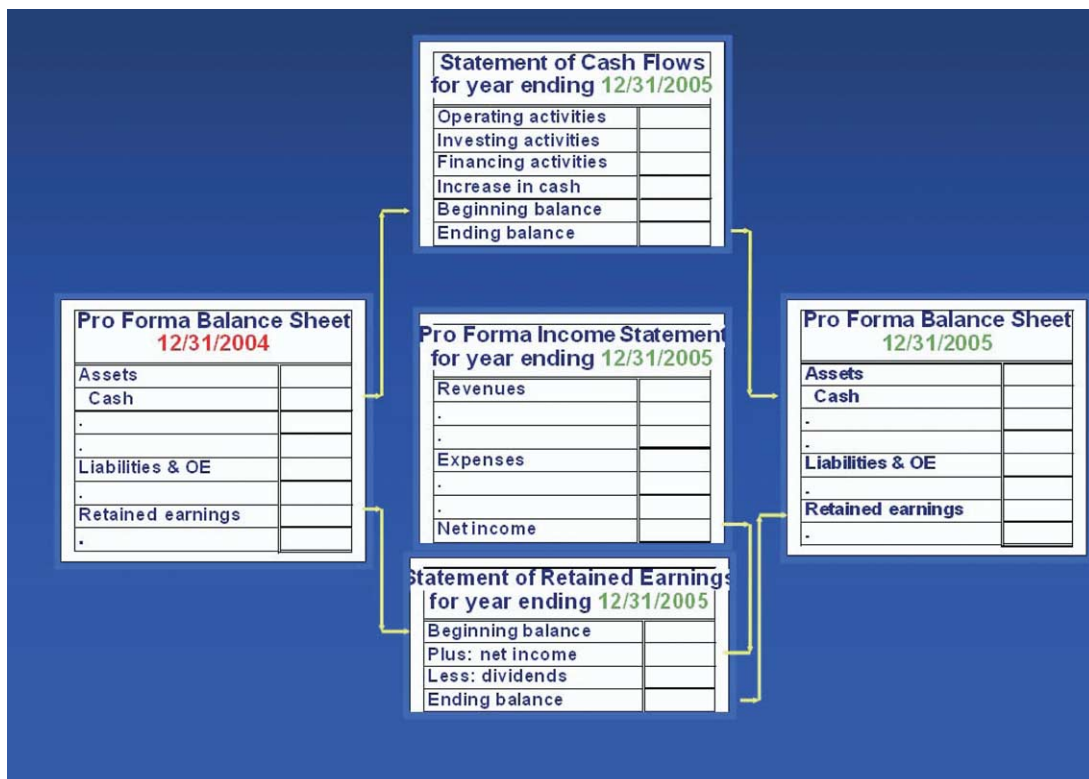


Fig. 9. Relationship between financial statements. OE = owners' equity.

	Year			
	2004	2005	2006	2007
<i>Edmonds Medical Imaging Income Statement associated with a proposed 3-T acquisition</i>				
1 Revenues (inflows)	\$1,431	\$1,789	\$2,147	\$2,468
2 Operating expenses (outflows)	\$775	\$993	\$1,123	\$1,243
3 Depreciation (accounting expense)	\$600	\$600	\$600	\$600
4 Pre-tax profit (1-2-3)	\$56	\$196	\$424	\$625
5 Tax at 34% (outflow)	\$19	\$67	\$144	\$213
6 Net income after taxes (4-5)	\$37	\$129	\$280	\$413

Fig. 10. Income statement used for business plan for a 3-T acquisition; an accounting statement, it should not be used for executive decision making.

present value (NPV) of the planned facility. Both current financial statements and predicted (pro forma) statements are used to arrive at this figure. (See the Appendix for a short introduction to NPV.)

Radiology practices are capital-intensive businesses and thus put great emphasis on cash flow forecasting. Running out of cash is always very inconvenient and may lead to foreclosure. In forecasting cash flows, it is important to recall the uncertainties involved. Cash inflows may come from the practice's central activities or from other sources, such as research or state grants. Some are relatively easy to predict because they are routine and recurring. Others vary considerably from period to period or may be totally unexpected. Forecasts of cash inflows for radiology businesses usually start with forecasts of clinical revenues from diagnostic services. Although based on past experience, revenue forecasts also look to the future and may consider factors such as trends in market preferences, the state of the economy, cyclical and seasonal factors, competitors' actions, and advances in medical technology. In addition, the practice may be able to affect revenues through its advertising and its bill collection policy. The EMI decision problem will have long-term implications and cash flow implications for 4 years. Because the costs and benefits from different years are not comparable, we use discounted cash flows in calculating the NPV of the 3-T investment proposal.

The NPV of this investment is based on discounting cash flows, not accounting earnings. We focus on cash flows and not on accounting earnings because these earnings are adjusted using accruals as discussed above. In this case, we cannot use the net income after taxes (shown in Fig. 10) to calculate NPV because the \$2,400,000 initial investment is not written off in the first year. It is rather capitalized, then expensed over 4 years via the accounting accruals of depreciation as mentioned above. The correct way to do that is shown in Fig. 11. There, the net annual cash flow is set equal

to the sum of the net cash flow from operations (line 4) and the cash from investment (line 5). When calculating NPV, we need the basic information from more than one financial statement as a basis for calculating profitability. For example, here we could use the pro forma cash flow statement (cash) along with the pro forma income statement (revenues, expenses) and the pro forma balance sheet (assets) in building the needed investment model.

The important lesson learned from this example is that the investor should discount cash flows, not accounting earnings, because cash flows can be reinvested to generate added earnings, which is not always possible with accounting earnings.

Overall, in addition to the financial accounting statements discussed above, radiology executives must develop managerial metrics to track the performance of their practice over time. Typical metrics to look at include, but are not limited to, temporal changes and emerging trends in:

- patterns in capital spending,
- changes in profit margin,
- revenue per employee,
- cost per procedure or modality,
- growth in revenues,
- procedure volume, and
- procedure mix.

SUMMARY

The accounting information system is designed to provide useful information for those making decisions about the radiology practice. As radiology becomes more capital-intensive, it depends more heavily on external financing. Potential sources must decide to what extent they will provide capital to those wanting it, and at what price.

	Year				
	2003	2004	2005	2006	2007
Edmonds Medical Imaging Cash Flow Analysis associated with a proposed 3-T acquisition					
1. Revenues (inflows)		\$1,431	\$1,789	\$2,147	\$2,468
2. Operating expenses (outflows)		\$775	\$993	\$1,123	\$1,243
3. Tax at 34% (outflow)		\$19	\$67	\$144	\$213
4. Net operating cash flow (1-2-3)		\$637	\$729	\$880	\$1,013
5. Cash flow from investment (outflow)	(\$2,400)				
6. Net annual cash flow (4+5)	(\$2,400)	\$637	\$729	\$880	\$1,013
7. PV at 12%	(\$2,400)	\$569	\$581	\$626	\$644
8. NPV	\$20				
Net annual cash flow = Net cash flow from operations (line 4) + Cash from investment (line 5)					
Note: PV = present value; NPV = net present value					

Fig. 11. Executive decision on the basis of cash flows of business plan for a 3-T acquisition.

To make these decisions, they need information, and a significant part of this information is often in the form of the four financial statements as discussed above. Understanding these reports helps radiology executives optimally link the performance of their practice to specific strategic financial decisions by shareholders, senior management, or the capital market when the practice tries to secure outside funding.

ACKNOWLEDGMENTS

We would like to thank the editor of *JACR* and the two anonymous referees for their careful review and constructive comments. We would also like to note our appreciation for comments on an earlier version of the paper by the late Professor Edna Seidmann of the Simon School of Business at the University of Rochester.

APPENDIX

A Brief Introduction to Net Present Value

Net present value (NPV) is a bedrock concept of modern financial theory and practice. It forms—or should form—the basis by which the financial value of any project should be evaluated. Financially speaking, an investment in a project should occur if and only if it yields a positive NPV. The methodology to calculate the NPV is rather simple and relies on two important principles and one important convention.

The convention is that all cash outflows are treated as negative numbers and all cash inflows are treated as positive numbers.

The first principle is that there is a one-to-one equivalence between a cash flow today and a cash flow in another time period, typically predicated on the notion that a dollar today is worth more than a dollar tomorrow. Suppose an investor expects to earn 10% per year for her investments. Then, if she invests a million dollars in a one-year transaction, the expected payout would be \$1.1 million next year. Now, think of the transaction in reverse. If the expected payout of an investment is \$1.1 million after one year and the discount rate is 10%, how much is that cash flow worth today? The answer, which we know is \$1 million, can be calculated as $\$1,100,000 / (1 + 0.10)$. The general formula to calculate the present value, PV , of a cash flow $\$FV$ over n periods in the future is $PV = FV / (1 + r)^n$, where r is the per-period discount rate.

The second key principle is that the present values of multiple future cash flows are additive. What that means is that the present values of cash flows that occur at different times can be added together to calculate the project's present value. Suppose we extend our example to have two cash flows: the first, as before, is \$1.1 million 1 year into the future. The second is \$1.21 million 2 years into the future. What is the present value of this investment opportunity? We have already seen that at an annual discount rate of 10%, the present value of the first cash flow is \$1 million. The present value of the second cash flow is $\$1,210,000 / (1 + 0.1)^2$, or \$1 million again. Adding the two present values yields a present value for the 2-year project of \$2 million.

Finally, the “net” part of the NPV comes from adjustments for any cash flows that occur in the present. Suppose the project with two cash flows as described in the previous paragraph requires an investment of \$1,800,000 today. Then, the NPV of the project is \$2 million (the present value of the future cash flows) less \$1.8 million (the required cash outflow today), or \$200,000. Because this is a positive NPV project, it should be undertaken. On the other hand, if one had to invest \$2.1 million in the project, it would

not be financially viable, because the NPV would be $-\$100,000$.

ADDITIONAL READING

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