**CHAPTER 23**

**PERFORMANCE MEASUREMENT, COMPENSATION, AND**

# MULTINATIONAL CONSIDERATIONS

**23-1** Examples of financial and nonfinancial measures of performance are

Financial: ROI, residual income, economic value added, and return on sales

Nonfinancial: Customer perspective: Market share, customer satisfaction

Internal-business-processes perspective: Manufacturing lead time, yield, on-time performance, number of new product launches, and number of new patents filed

Learning-and-growth perspective: employee satisfaction, information-system availability

**23-2** The three steps in designing an accounting-based performance measure are as follows:

1. Choose performance measures that align with top management’s financial goals.

2. Choose the details of each performance measure in Step 1, including the time horizon and measurement of various aspects of the measure.

3. Choose a target level of performance and feedback mechanism for each performance measure in Step 1.

**23-3** The DuPont method highlights that ROI is increased by any action that increases return on sales or investment turnover. ROI increases with

1. increases in revenues,

2. decreases in costs, or

3. decreases in investments,

while holding the other two factors constant.

**23-4** Yes. Residual income (RI) is not identical to return on investment (ROI). ROI is a percentage with investment as the denominator of the computation. RI is an absolute monetary amount which includes an imputed interest charge based on investment.

**23-5** Economic value added (EVA) is a specific type of residual income measure that is calculated as follows:

= – 

**23-6** Definitions of investment used in practice when computing ROI are as follows:

1. Total assets available

2. Total assets employed

3. Total assets employed minus current liabilities

4. Stockholders’ equity

**23-7** Current cost is the cost of purchasing an asset today identical to the one currently held if an identical asset can currently be purchased; it is the cost of purchasing an asset that provides services like the one currently held if an identical asset cannot be purchased. Historical-cost-based measures of ROI compute the asset base as the original purchase cost of an asset minus any accumulated depreciation.

Some commentators argue that current cost is oriented to current prices, while historical cost is past-oriented.

**23-8** Special problems arise when evaluating the performance of divisions in multinational companies because

a. the economic, legal, political, social, and cultural environments differ significantly across countries.

b. governments in some countries may impose controls and limit selling prices of products.

c. availability of materials and skilled labor, as well as costs of materials, labor, and infrastructure may differ significantly across countries.

d. divisions operating in different countries keep score of their performance in different currencies.

**23-9** In some cases, the subunit’s performance may not be a good indicator of a manager’s performance. For example, companies often put the most skillful division manager in charge of the weakest division in an attempt to improve the performance of the weak division. Such an effort may yield results in years, not months. The division may continue to perform poorly with respect to other divisions of the company. But it would be a mistake to conclude from the poor performance of the division that the manager is performing poorly.

A second example of the distinction between the performance of the manager and the performance of the subunit is the use of historical cost-based ROIs to evaluate the manager even though historical cost-based ROIs may be unsatisfactory for evaluating the economic returns earned by the organization subunit. Historical cost-based ROI can be used to evaluate a manager by comparing actual results to budgeted historical cost-based ROIs.

**23-10** Moral hazard describes situations in which an employee prefers to exert less effort (or to report distorted information) compared with the effort (or accurate information) desired by the owner because the employee’s effort (or validity of the reported information) cannot be accurately monitored and enforced.

**23-11** No, rewarding managers on the basis of their performance measures only, such as ROI, subjects them to uncontrollable risk because managers’ performance measures are also affected by random factors over which they have no control. A manager may put in a great deal of effort but her performance measure may not reflect this effort if it is negatively affected by various random factors. Thus, when managers are compensated on the basis of performance measures, they will need to be compensated for taking on extra risk. Therefore, when performance-based incentives are used, they are generally more costly to the owner. The motivation for having some salary and some performance-based bonus in compensation arrangements is to balance the benefits of incentives against the extra costs of imposing uncontrollable risk on the manager.

**23-12** Benchmarking or relative performance evaluation is the process of evaluating a manager’s performance against the performance of other similar operations. The ideal benchmark is another operation that is affected by the same noncontrollable factors that affect the manager’s performance. Benchmarking cancels the effects of the common noncontrollable factors and provides better information about the manager’s performance.

**23-13** When employees have to perform multiple tasks as part of their jobs, incentive problems can arise when one task is easy to monitor and measure while the other task is more difficult to evaluate. Employers want employees to intelligently allocate time and effort among various tasks. If, however, employees are rewarded on the basis of the task that is more easily measured, they will tend to focus their efforts on that task and ignore the others.

**23-14** Disclosures required by the Securities and Exchange Commission are as follows:

a. A summary compensation table showing the salary, bonus, stock options, other stock awards, and other compensation earned by the five top officers in the previous three years

b. The principles underlying the executive compensation plans, and the performance criteria, such as profitability, sales growth, and market share used in determining compensation

c. How well a company’s stock performed relative to the stocks of other companies in the same industry

**23-15** The four levers of control in an organization are diagnostic control systems, boundary systems, belief systems, and interactive control systems.

* Diagnostic control systems are the set of critical performance variables that help managers track progress toward the strategic goal. These measures are periodically monitored and action is usually only taken if a measure is outside its acceptable limits.
* Boundary systems describe standards of behavior and codes of conduct expected of all employees, particularly by defining actions that are off-limits. Boundary systems prevent employees from performing harmful actions.
* Belief systems articulate the mission, purpose, and core values of a company. They describe the accepted norms and patterns of behavior expected of all managers and other employees with respect to each other, shareholders, customers, and communities.
* Interactive control systems are formal information systems that managers use to focus an organization's attention and learning on key strategic issues. They form the basis of ongoing discussion and debate about strategic uncertainties that the business faces and help position the organization for the opportunities and threats of tomorrow.

**23-16** (30 min.) **ROI, comparisons of three companies.**

1. The separate components highlight several features of return on investment not revealed by a single calculation:

a. The importance of investment turnover as a key to income is stressed.

b. The importance of revenues is explicitly recognized.

c. The important components are expressed as ratios or percentages instead of dollar figures. This form of expression often enhances comparability of different divisions, businesses, and time periods.

d. The breakdown stresses the possibility of trading off investment turnover for income as a percentage of revenues so as to increase the average ROI at a given level of output.

2. (Filled-in blanks are in bold face.)

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Companies in Same Industry** | | |
|  | **A** | **B** | **C** |
| Revenue  Income  Investment  Income as a % of revenue  Investment turnover  Return on investment | $500,000  $ 150,000  $ 250,000  **30%**  **2.0**  **60%** | $ 200,000  $ 60,000  **$1,000,000**  **30%**  **0.2**  6% | **$2,000,000**  **$ 60,000**  $ 1,000,000  3.0%  2.0  **6%** |

Income and investment alone shed little light on comparative performances because of disparities in size between Company A and the other two companies. Thus, it is impossible to say whether B’s low return on investment in comparison with A’s is attributable to its larger investment or to its lower income. Furthermore, the fact that Companies B and C have identical income and investment may suggest that the same conditions underlie the low ROI, but this conclusion is erroneous. B has higher margins but a lower investment turnover. C has very small margins (1/10th of B) but turns over investment 10 times faster.

*I.M.A. Report No. 35* (page 35) states:

Introducing revenues to measure level of operations helps to disclose specific areas for more intensive investigation. Company B does as well as Company A in terms of income margin, for both companies earn 30% on revenues. But Company B has a much lower turnover of investment than does Company A. Whereas a dollar of investment in Company A supports two dollars in revenues each period, a dollar investment in Company B supports only twenty cents in revenues each period. This suggests that the analyst should look carefully at Company B’s investment. Is the company keeping an inventory larger than necessary for its revenue level? Are receivables being collected promptly? Or did Company A acquire its fixed assets at a price level that was much lower than that at which Company B purchased its plant?

On the other hand, C’s investment turnover is as high as A’s, but C’s income as a percentage of revenue is much lower. Why? Are its operations inefficient, are its material costs too high, or does its location entail high transportation costs?

Analysis of ROI raises questions such as the foregoing. When answers are obtained, basic reasons for differences between rates of return may be discovered. For example, in Company B’s case, it is apparent that the emphasis will have to be on increasing turnover by reducing investment or increasing revenues. Clearly, B cannot appreciably increase its ROI simply by increasing its income as a percent of revenue. In contrast, Company C’s management should concentrate on increasing the percent of income on revenue.

**23-17** (30 min.) **Analysis of return on invested assets, comparison of two divisions, DuPont method.**

1.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Operating Income** | **Operating Revenues** | **Total Assets** | **Operating Income**  **Operating Revenues** | **Operating Revenues**  **Total Assets** | **Operating Income Total Assets** |
| **Test Preparation Division** |  |  |  |  |  |  |
| **2012** | $720 | $9,000 | $1,800 | **8.0%** | **5.0** | **40.0%** |
| **2013** | 920 | **$920 11.5% = $8,000** | **$920  46% = $2,000** | 11.5% | **4.0** | 46.0% |
| **2014** | 1,140 | **$1,140 9.5% = $12,000** | **$12,000  6 = $2,000** | 9.5% | 6.0 | **57.0%** |
| **Language Arts Division** |  |  |  |  |  |  |
| **2012** | $660 | $3,000 | $2,000 | **22.0%** | **1.5** | **33.0%** |
| **2013** | **$3,525 20%= $705** | 3,525 | 2,350 | 20.0% | **1.5** | **30.0%** |
| **2014** | **$2,900 20% = $580** | **$2,900 1.6 = $4,640** | 2,900 | **12.5%** | 1.6 | 20.0% |
| **Global Data, Inc.** |  |  |  |  |  |  |
| **2012** | $1,380 | $12,000 | $3,800 | **11.5%** | **3.2** | **36.3%** |
| **2013** | **$920 + $705 = $1,625** | **$8,000 + $3,525 = $11,525** | **$2,000 + $2,350 = $4,350** | **14.1%** | **2.6** | **37.4%** |
| **2014** | **$1,140 + $580 = $1,720** | **$12,000 + $4,640 = $16,640** | **$2,000 + $2,900 = $4,900** | **10.3%** | **3.4** | **35.1%** |

2. Based on revenues, Test Preparation is more than twice the size of Language Arts. In addition, the Test Preparation Division turns over its assets at more than twice the rate of the Language Arts Department (operating revenues as a multiple of total assets). However, Language Arts is twice as profitable in terms of margins (operating income as a percent of operating revenues).

The net result is that Test Preparation has a higher ROI, typically in the 40–60% range, while Language Arts has ROI in the 20–35% range. Moreover, the ROI of the Test Preparation Division has been increasing from 2012 to 2014, while the ROI of the Language Arts Department has been falling. Overall, this has resulted in Global Data showing stable ROI over the past three years.

* 1. (10–15 min.) **ROI and RI**.

1. Operating income = (Contribution margin per unit  150,000 units) – Fixed costs

= ($720 – $500)  150,000 – $30,000,000 = $3,000,000

ROI =  = $3,000,000 ÷ $48,000,000 = 6.25%

2. Operating income = ROI  Investment

[No. of pairs sold  (Selling price – Var. cost per unit)] – Fixed costs = ROI Investment

Let $X = minimum selling price per unit to achieve a 25% ROI

150,000 ($X – $500) – $30,000,000 = 25% ($48,000,000)

$150,000X = $12,000,000 + $30,000,000 + $75,000,000

X = $780

3. Let $X = minimum selling price per unit to achieve a 20% rate of return

150,000 ($X – $500) – $30,000,000 = 20% ($48,000,000)

$150,000X = $9,600,000 + $30,000,000 + $75,000,000

X = $764

**23-19** (20 min.) **ROI and RI with manufacturing costs.**

1. The operating income is:

|  |  |  |
| --- | --- | --- |
| Sales revenue ($13,000 × 9,000) |  | $117,000,000 |
| Less: |  |  |
| Direct materials ($1,000 × 9,000) | $ 9,000,000 |  |
| Setup ($1,600 × 7,000) | 11,200,000 |  |
| Production ($470 × 176,500) | 82,955,000 | 103,155,000 |
| Gross margin |  | $ 13,845,000 |
| Selling and administration |  | 8,940,000 |
| Operating income |  | $ 4,905,000 |

Average invested capital is ($24,500,000 + $30,000,000) ÷ 2 = $27,250,000

ROI =$4,905,000 / $27,250,000 =18%

2. Residual income = Operating income − (8% × Invested capital)

= $4,905,000 − (8% × $27,250,000)

= $4,905,000 − $2,180,000

= $2,725,000

**23-20** (20 min.) **ROI, RI, EVA.**

1. The after-tax net income is:

|  |  |  |
| --- | --- | --- |
| Operating income |  | $200,000 |
| Less: |  |  |
| Interest expense ($600,000 × 6.25%) |  | 37,500 |
| Income after interest and before taxes |  | $162,500 |
| Income taxes ($162,500 × 20%) |  | 32,500 |
| Net income after taxes |  | $130,000 |

2. Investment = Total assets = $1,250,000

Income = Operating income = $200,000

ROI =  = 16%

3. Income = Operating income = $200,000

Imputed cost of investment = Investment ($1,250,000) × Required rate of return (10%)

= $125,000

Residual income = Income – Imputed cost of investment

= $200,000 – $125,000

= $75,000

4. a. Net operating profit after taxes = Operating income × (1 – Tax rate)

= $200,000 × (1 – 0.2)

= $160,000

b. Market value of debt = $600,000

After-tax cost of debt = 6.25% × (1 – Tax rate) = 6.25% × 80% = 5%

Market value of equity = $400,000 × 2 = $800,000

Cost of equity capital = 12%

Weighted-average cost of capital =  = 9%

c. Investment = Total Assets – Current Liabilities = $1,250,000 – $250,000 = $1,000,000

Therefore, EVA = $160,000 – 9% × $1,000,000 = $70,000.

**23-21** (25 min.) **Goal incongruence and ROI.**

1. McCall would be better off if the machine is replaced. Its cost of capital is 4%, and the IRR of the investment is 10%, indicating that this is a positive net present value project.

2. The ROIs for the first five years are as follows:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Year 1** | **Year 2** | **Year 3** | **Year 4** | **Year 5** |
| Operating income1 | $3,000 | $3,000 | $3,000 | $3,000 | $3,000 |
| End of year net assets | 45,000 | 40,000 | 35,000 | 30,000 | 25,000 |
| Average net assets | 47,5002 | 42,500 | 37,500 | 32,500 | 27,500 |
| ROI | 6.32% | 7.06% | 8.00% | 9.23% | 10.91% |

1Income is cash savings of $8,000 less $5,000 annual depreciation expense.

2 ($50,000 + $45,000) ÷ 2 = $47,500

The manager would not want to replace the machine before retiring because the division is currently earning a ROI of 10%, and replacement of the machine will lower the ROI every year until the fifth year, when the manager is long gone.

3. McCall could use long-term rather than short-term ROI, or use ROI and some other long-term measures to evaluate the Patio Furniture division to create goal congruence. Evaluating the managers on residual income rather than ROI would also achieve goal congruence. For example, replacing the machine increases residual income in Year 1.

Residual income = Operating income − (4% × Average net assets)

= $3,000 − (4% × 47,500)

= $3,000 − $1,900 = $1,100

**23-22** (25 min.) **ROI,** **RI, EVA.**

1. The required division ROIs using total assets as a measure of investment is shown in the row labeled (1) in Solution Exhibit 23-22.

**SOLUTION EXHIBIT 23-22**

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | **New Car**  **Division** | **Performance Parts Division** |
|  | Total assets | $33,000,000 | $28,500,000 |
|  | Current liabilities | $6,600,000 | $8,400,000 |
|  | Operating income | $2,475,000 | $2,565,000 |
|  | Required rate of return | 12% | 12% |
|  | Total assets – current liabilities | $26,400,000 | $20,100,000 |
| **(1)** | ROI (based on total assets) ($2,475,000$33,000,000; $2,565,000 $28,500,000) | 7.5% | 9.0% |
| **(2)** | RI (based on total assets – current liabilities) ($2,475,000 – (12% $26,400,000); $2,565,000 – (12% $20,100,000)) | $(693,000) | $153,000 |
| **(3)** | RI (based on total assets) ($2,475,000 – (12% $33,000,000); $2,565,000 – (12% $28,500,000)) | $(1,485,000) | $(855,000) |

2. The required division RIs using total assets minus current liabilities as a measure of investment is shown in the row labeled (2) in the table above.

3. The row labeled (3) in the table above shows division RIs using assets as a measure of investment. Even with this new measure that is insensitive to the level of short-term debt, the New Car Division has a worse RI than the Performance Parts Division. Both RIs are negative, indicating that the divisions are not earning the 12% required rate of return on their assets.

4. After-tax cost of debt financing = (1– 0.4) 10% = 6%

After-tax cost of equity financing = 15%

  = 9.6%

Operating income after tax

0.6  operating income before tax $ 1,485,000 $1,539,000

(0.6 $2,475,000; 0.6 $2,565,000)

Required return for EVA

9.6%  Investment

(9.6% $26,400,000; 9.6% $20,100,000) 2,534,400 1,929,600

EVA (Optg. inc. after tax – reqd. return) $(1,049,400) $ (390,600)

5. Both the residual income and the EVA calculations indicate that the Performance Parts Division is performing better than the New Car Division. The Performance Parts Division has a higher residual income. The negative EVA for both divisions indicates that, on an after-tax basis, the divisions are destroying value––the after-tax economic returns from them are less than the required returns.

**23-23** (30 min.) **Capital budgeting, RI.**

1. Annual depreciation = $200,000/5 years = $40,000

Annual cash flows = Sales revenues – Cash costs – Cash taxes

= $100,000 – $42,000 – 20% × ($100,000 – $42,000 – $40,000)

= $54,400

Net present value = – $200,000 + $54,400 × PV of $1 Annuity (5 years, 10%)

= $6,218.80.

The project has a positive net present value at the required rate of return of 10% and so is a project Hansen Partners would want to take.

2. The annual after-tax accounting income from the project is:

80% × ($100,000 – $42,000 – $40,000) = $14,400

The residual incomes in each period are given by:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Year 1** | **Year 2** | **Year 3** | **Year 4** | **Year 5** |
| Investment | $200,000 | $160,000 | $120,000 | $80,000 | $40,000 |
| Capital charge (10%) | 20,000 | 16,000 | 12,000 | 8,000 | 4,000 |
| After-tax income | 14,400 | 14,400 | 14,400 | 14,400 | 14,400 |
| Residual income1 | $(5,600) | $(1,600) | $2,400 | $6,400 | $10,400 |

1After-tax income – Capital charge

3. To verify the conservation property, we have to check whether the net present value of the stream of residual incomes equals the net present value of the project. At the required rate of return of 10%, the present value of the residual incomes identified in requirement 2 is:

 = $6,218.80

This is identical to the net present value of the project, which was calculated in requirement 1 as $6,218.80. Therefore, the conservation property of residual income does in fact hold.

4. Not necessarily. From requirement 3, the conservation property guarantees that over the lifetime of the project, it will generate the equivalent in residual incomes of its net present value. However, the project generates negative residual income figures over its first two years (see requirement 2). Therefore, if Samantha is not committed to staying with Hansen Partners for the project’s lifetime of five years (and in particular if she expects to leave after the first two years), she would choose to reject the project rather than take the hit to her residual income performance figures. The conservation property, while a truly remarkable identity, does not solve the horizon problem: When compensated via residual income, managers with a different time horizon than the firm, or those who discount the future at a different rate than the firm’s shareholders, may not have the incentive to take the right decisions on behalf of the shareholders.

**23-24** (20 min.) **Multinational performance measurement, ROI, RI.**

1a. U.S. Division's ROI in 2014 = = = 13.75%

Hence, operating income = 13.75% × $8,000,000 = $1,100,000.

1b. Norwegian Division’s ROI in 2014 (based on kroners) = = 14%

2. Convert total assets into dollars using the December 31, 2013 exchange rate, the rate prevailing when the assets were acquired (6 kroners = $1):

 = $9,000,000

Convert operating income into dollars at the average exchange rate prevailing during 2014 when operating income was earned (7 kroners = $1):

 = $1,080,000

Comparable ROI for Norwegian Division = = 12%

The Norwegian Division’s ROI based on kroners is helped by the inflation that occurred in Norway in 2014 (that caused the Norwegian kroner to weaken against the dollar from 6 kroners = $1 on 12-31-2013 to 8 kroners = $1 on 12-31-2014). Inflation boosts the division's operating income. Because the assets were acquired at the start of the year 2014, the asset values are not increased by the inflation that occurs during the year. The net effect of inflation on ROI calculated in kroners is to use an inflated value for the numerator relative to the denominator. Adjusting for inflationary and currency differences negates the effects of any differences in inflation rates between the two countries on the calculation of ROI. After these adjustments, the U.S. Division earned a higher ROI (13.75%) than the Norwegian Division (12%).

3. U.S. Division’s RI in 2014 = $1,100,000 − (13% × $8,000,000)

= $1,100,000 − $1,040,000 = $60,000

Norwegian Division’s RI in 2014 (in U.S. dollars) is calculated as:

$1,080,000 − (13% × $9,000,000) = $1,080,000 − $1,170,000 = $(90,000).

The U.S. Division’s RI also exceeds the Norwegian Division’s RI in 2014 by $150,000.

**23-25** (20 min.) **ROI, RI, EVA and Performance Evaluation.**

1. ROI and residual income:

|  |  |  |
| --- | --- | --- |
|  | **Clothing** | **Cosmetics** |
| Operating income after tax | $ 800,000 | $ 1,800,000 |
| Net assets | $3,200,000 | $7,500,000 |
| ROI  ($800,000 ÷ $3,200,000; $1,800,000 ÷ $7,500,000) | 25.00% | 24.00% |
| RI  ($800,000 − 11% × 3,200,000; $1,800,000 − 11% × $7,500,000) | $ 448,000 | $ 975,000 |

The choice of measure used to evaluate performance will determine which division gets the bonus. If Lucy uses ROI, then the Clothing Division will get the bonus. However, the Cosmetics Division has much larger absolute and residual income. If Lucy evaluates performance based on residual income, then the Cosmetics Division will get the bonus.

The advantages of ROI are that it is easy to calculate and easy to understand. It combines revenue, cost, and investment into a single number, so that managers can clearly see what can be changed to increase returns. But ROI has limitations. Managers who are evaluated based on ROI have incentives to reject investments with ROIs below their divisions’ current average ROI, even when the investments have positive net present values.

Residual income has the advantage of goal congruence because any investment that earns more than the required capital charge increases RI and, thereby, increases the managers’ performance evaluations. The measure is not subject to the “cutoff” problems that occur when managers compare a new investment’s ROI to the average ROI being earned on existing investments. However, RI is not as easy to measure because it requires the company to determine the amount of capital and the cost of capital for each business unit.

2.

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Clothing** | **Cosmetics** | |
| Adjusted operating income | $ 938,000 | | $1,147,200 |
| Net assets less current liabilities | $2,680,000 | | $7,170,000 |
| Revised ROI  ($938,000 ÷ $2,680,000; $1,147,200 ÷ $7,170,000) | 35.00% | | 16.00% |
| EVA  ($938,000 − 11% × $2,680,000; $1,147,200 − 11% × $7,170,000) | $ 643,200 | | $ 358,500 |

Clothing Division will get the bonus because both EVA and ROI (using EVA’s definition of operating income and assets) are higher than those of the Cosmetics Division.

3. Because this is a manufacturing firm, there are a variety of nonfinancial performance measures such as market share, customer satisfaction, defect rates, and response times that can be used to ensure that managers do not increase short-term operating income, residual income, or EVA at the expense of performance categories that are long-term drivers of company value.

**23-26** (20–30 min.) **Risk sharing, incentives, benchmarking, multiple tasks.**

1. An evaluation of the three proposals to compensate Marks, the general manager of the Dexter Division follows:

a. Paying Marks a flat salary will not subject Marks to any risk, but it will provide no incentives for Marks to undertake extra physical and mental effort.

b. Rewarding Marks only on the basis of Dexter Division’s ROI would motivate Marks to put in extra effort to increase ROI because Marks’s rewards would increase with increases in ROI. But compensating Marks solely on the basis of ROI subjects Marks to excessive risk because the division’s ROI depends not only on Marks’s effort but also on other random factors over which Marks has no control. For example, Marks may put in a great deal of effort, but, despite this effort, the division’s ROI may be low because of adverse factors (such as high interest rates or a recession) which Marks cannot control.

To compensate Marks for taking on uncontrollable risk, AMCO must pay him additional amounts within the structure of the ROI-based arrangement. Thus, compensating Marks only on the basis of performance-based incentives will cost AMCO more money, on average, than paying Marks a flat salary. The key question is whether the benefits of motivating additional effort justify the higher costs of performance-based rewards.

Furthermore, the objective of maximizing ROI may induce Marks to reject projects that, from the viewpoint of the organization as a whole, should be accepted. This would occur for projects that would reduce Marks’s overall ROI but that would earn a return greater than the required rate of return for that project.

c.The motivation for having some salary and some performance-based bonus in compensation arrangements is to balance the benefits of incentives against the extra costs of imposing uncontrollable risk on the manager.

2. Marks’s complaint does not appear to be valid. The senior management of AMCO is proposing to benchmark Marks’s performance using a relative performance evaluation (RPE) system. RPE controls for common uncontrollable factors that similarly affect the performance of managers operating in the same environments (for example, the same industry). If business conditions for car battery manufacturers are good, all businesses manufacturing car batteries will probably perform well. A superior indicator of Marks’s performance is how well Marks performed relative to his peers. The goal is to filter out the common noise to get a better understanding of Marks’s performance. Marks’s complaint will be valid only if there are significant differences in investments, assets, and the business environment in which AMCO and Tiara operate. Given the information in the problem, this does not appear to be the case.

Of course, using RPE does not eliminate the problem with the ROI measure itself. To keep ROI high, Marks will still prefer to reject projects whose ROI is greater than the required rate of return but lower than the current ROI.

3. Superior performance measures change significantly with the manager’s performance and not very much with changes in factors that are beyond the manager’s control. If Marks has no authority for making capital investment decisions, then ROI is not a good measure of Marks’s performance––it varies with the actions taken by others rather than the actions taken by Marks. AMCO may wish to evaluate Marks on the basis of operating income rather than ROI.

ROI, however, may be a good measure to evaluate Dexter’s economic viability. Senior management at AMCO could use ROI to evaluate if the Dexter Division’s income provides a reasonable return on investment, regardless of who has authority for making capital investment decisions. That is, ROI may be an inappropriate measure of Marks’s performance but a reasonable measure of the economic viability of the Dexter Division. If, for whatever reasons—bad capital investments, weak economic conditions, etc.—the Division shows poor economic performance as computed by ROI, AMCO management may decide to shut down the division even though they may simultaneously conclude that Marks performed well.

4. There are three main concerns with Marks’s plans. First, creating very strong sales incentives imposes excessive risk on the sales force because a salesperson’s performance is affected not only by his or her own effort, but also by random factors (such as a recession in the industry) that are beyond the salesperson’s control. If salespersons are risk averse, the firm will have to compensate them for bearing this extra uncontrollable risk. Second, compensating salespersons only on the basis of sales creates strong incentives to sell but may result in lower levels of customer service and sales support (this was the story at Sears auto repair shops where a change in the contractual terms of mechanics to “produce” more repairs caused unobservable quality to be negatively affected). Where employees perform multiple tasks, it may be important to “blunt” incentives on those aspects of the job that can be measured well (for example, sales) to try and achieve a better balance of the two tasks (for example, sales and customer service and support). In addition, the division should try to better monitor customer service and customer satisfaction through surveys, or through quantifying the amount of repeat business. Finally, setting compensation on the basis of number of units sold, rather than the revenue generated, may result in excess discounting by salespersons whose goal is to increase volume without attention to the impact on brand perception or the division’s income from prices that are too low.

**23-27** (20 min.) **Residual income and EVA; timing issues**.

1. RI = Operating income – (WACC × Assets)

= $690,000 – (0.05 × $5,900,000)

= $690,000 – $295,000

= $395,000

2. EVA = Adjusted operating income – (WACC × (Total assets – Current liabilities))

Operating income is adjusted as follows:

Operating income $ 690,000

Add back this period’s advertising expense 120,000

Less amortized advertising (1/4 of year’s expense) (30,000)

Adjusted operating income $ 780,000

Assets are adjusted as follows:

Total assets $5,900,000

Plus capitalized, unamortized advertising 90,000

Adjusted total assets $5,990,000

EVA = $780,000 – (0.05 × ($5,990,000 − $750,000))

= $780,000 − $262,000

= $518,000

3. The differences between the RI and EVA results are due to two factors in this problem: the definition of capital and the treatment of advertising. EVA subtracts current liabilities from total assets when computing capital. Because some types of current liabilities represent sources of “free” short-term funds (e.g., holding off payments to suppliers), they reduce the assets needed to produce income. If short-term liabilities represent a source of funds, EVA more accurately reflects the assets that the company employed to achieve its operating income. Under traditional accounting rules, advertising is a period expense, and the costs and benefits of advertising are not matched if advertising affects revenues over multiple years. Consequently, EVA does a better job matching revenues and costs when the effects of advertising persist over multiple periods and solves the goal incongruence problem that sometimes arises with the RI measures.

**23-28** (40–50 min.) **ROI performance measures based on historical cost and current cost.**

1. ROI using historical cost measures:

Passion Fruit $ 480,000 ÷ $ 965,000 = 49.74%

Kiwi Fruit $ 575,000 ÷ $2,175,000 = 26.44%

Mango Fruit $1,210,000 ÷ $3,890,000 = 31.11%

The Passion Fruit Division appears to be considerably more efficient than the Kiwi Fruit and Mango Fruit Divisions.

2. The gross book values (i.e., the original costs of the plants) under historical cost are calculated as the useful life of each plant (12 years)  the annual depreciation:

Passion Fruit 12  $270,000 = $3,240,000  
 Kiwi Fruit 12  $175,000 = $2,100,000  
 Mango Fruit 12  $290,000 = $3,480,000

**Step 1:** Restate long-term assets from gross book value at historical cost to gross book value at current cost as of the end of 2014:

(Gross book value of long-term assets at historical cost)  (Construction cost index in 2014 ÷ Construction cost index in year of construction).

Passion Fruit $3,240,000  (200 ÷ 100) = $6,480,000

Kiwi Fruit $2,100,000  (200 ÷ 120) = $3,500,000

Mango Fruit $3,480,000  (200 ÷ 185) = $3,762,162

**Step 2:** Derive net book value of long-term assets at current cost as of the end of 2014. (Estimated useful life of each plant is 12 years.)

(Gross book value of long-term assets at current cost at the end of 2014)  (Estimated remaining useful life ÷ Estimated total useful life)

Passion Fruit $6,480,000  ( 2 ÷ 12) = $1,080,000

Kiwi Fruit $3,500,000  ( 9 ÷ 12) = $2,625,000

Mango Fruit $3,762,162  (11 ÷ 12) = $3,448,649

**Step 3:** Compute current cost of total assets at the end of 2014. (Assume current assets of each plant are expressed in 2014 dollars.)

(Net book value of long-term assets at current cost at the end of 2014 [Step 2]) + (Current assets at the end of 2014 [given])

Passion Fruit $1,080,000 + $425,000 = $1,505,000

Kiwi Fruit $2,625,000 + $600,000 = $3,225,000

Mango Fruit $3,448,649 + $700,000 = $4,148,649

**Step 4:** Compute current-cost depreciation expense in 2014 dollars.

Gross book value of long-term assets at current cost at the end of 2014 (from Step 1) ÷ 12

Passion Fruit $6,480,000 ÷ 12 = $540,000

Kiwi Fruit $3,500,000 ÷ 12 = $291,667

Mango Fruit $3,762,162 ÷ 12 = $313,514

**Step 5:**  Compute 2014 operating income using 2014 current-cost depreciation expense.

(Historical-cost operating income – [Current-cost depreciation expense in 2014 dollars (Step 4) – Historical-cost depreciation expense])

Passion Fruit $ 480,000 – ($540,000 – $270,000) = $ 210,000

Kiwi Fruit $ 575,000 – ($291,667 – $175,000) = $ 458,333

Mango Fruit $1,210,000 – ($313,514 – $290,000) = $1,186,486

**Step 6:** Compute ROI using current-cost estimates for long-term assets and depreciation expense

(Step 5 ÷ Step 3).

Passion Fruit $ 210,000 ÷ $1,505,000 = 13.95%

Kiwi Fruit $ 458,333 ÷ $3,225,000 = 14.21%

Mango Fruit $1,186,486 ÷ $4,148,649 = 28.60%

|  |  |  |
| --- | --- | --- |
|  | **ROI:**  **Historical Cost** | **ROI:**  **Current Cost** |
| Passion Fruit | 49.74% | 13.95% |
| Kiwi Fruit | 26.44 | 14.21 |
| Mango Fruit | 31.11 | 28.60 |

Use of current cost results in the Mango Fruit Division appearing to be the most efficient. The Passion Fruit ROI is reduced substantially when the 10-year-old plant is restated for the doubling of con­struction costs during the 2004 to 2014 period.

3. Use of current costs increases the comparability of ROI measures across divisions’ operating plants built at different con­struction cost price levels. Use of current cost also will increase the willingness of managers, evaluated on the basis of ROI, to move between divisions with assets purchased many years ago and divisions with assets purchased in recent years.

**23-29** (40–50 min.) **ROI, measurement alternatives for performance measures.**

1.ROI = Operating income ÷ Net book value of total assets

St. Louis ROI = $1,446,000 ÷ ($9,000,000 – $6,600,000 + 1,999,600)

= $1,446,000 ÷ $4,399,600

= 32.87%

Memphis ROI = $1,008,000 ÷ ($7,500,000 – $3,500,000 + 1,536,400)

= $1,008,000 ÷ $5,536,400

= 18.21%

New Orleans ROI = $932,000 ÷ ($8,100,000 – $2,160,000 + 1,649,200)

= $932,000 ÷ $7,589,200

= 12.28%

2.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Step 1:** |  |  |  |  |  |  |  |
|  | **Gross book value of long-term assets at historical cost** | **×** | **Construction cost index in 2014** | **÷** | **Construction cost index in year of construction** | **=** | **Gross book value of long-term assets at current cost at end of 2013** |
|  |  |  |  |  |  |  |  |
| St. Louis | $9,000,000 | × | (122 | ÷ | 100) | = | $10,980,000 |
| Memphis | $7,500,000 | × | (122 | ÷ | 110) | = | $ 8,318,182 |
| New Orleans | $8,100,000 | × | (122 | ÷ | 118) | = | $ 8,374,576 |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Step 2:** |  |  |  |  |  |  |  |
|  | **Gross book value of long-term assets at historical cost** | **×** | **Estimated remaining useful life** | **÷** | **Estimated useful life** | **=** | **Net book value of long-term assets at current cost at end of 2014** |
|  |  |  |  |  |  |  |  |
| St. Louis | $10,980,000 | × | ( 4 | ÷ | 15) | = | $2,928,000 |
| Memphis | $ 8,318,182 | × | ( 8 | ÷ | 15) | = | $4,436,364 |
| New Orleans | $ 8,374,576 | × | (11 | ÷ | 15) | = | $6,141,356 |

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| --- | --- | --- | --- | --- | --- |
| **Step 3:** |  |  |  |  |  |
|  | **Current assets at end of 2014** | **+** | **Long-term assets (from Step 2, above)** | **=** | **Current cost of total assets at end of 2014** |
|  |  |  |  |  |  |
| St. Louis | $1,999,600 | + | $2,928,000 | = | $4,927,600 |
| Memphis | $1,536,400 | + | $4,436,364 | = | $5,972,764 |
| New Orleans | $1,649,200 | + | $6,141,356 | = | $7,790,556 |

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| --- | --- | --- | --- | --- | --- |
| **Step 4:** |  |  |  |  |  |
|  | **Gross book value of long-term assets at current cost at end of 2014** | **+** | **Estimated total useful life** | **=** | **Current-cost depreciation expense in 2014 dollars** |
|  |  |  |  |  |  |
| St. Louis | $10,980,000 | + | 15 | = | $732,000 |
| Memphis | $ 8,318,182 | + | 15 | = | $554,545 |
| New Orleans | $ 8,374,576 | + | 15 | = | $558,305 |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Step 5:** |  |  |  |  |  |  |  |
|  | **Historical-cost operating income** | **–** | **Current-cost depreciation expense in 2014 dollars** | **–** | **Historical-cost depreciation expense** | **=** | **Operating income for 2014 using current-cost depreciation expense in 2014 dollars** |
|  |  |  |  |  |  |  |  |
| St. Louis | $1,446,000 | – | ($732,000 | – | $600,000) | = | $1,314,000 |
| Memphis | $1,008,000 | – | ($554,545 | – | $500,000) | = | $953,454 |
| New Orleans | $ 932,000 | – | ($558,305 | – | $540,000) | = | $913,695 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Step 6:** |  |  |  |  |  |
|  | **Operating income for 2014 using current-cost depreciation expense in 2014 dollars** | **÷** | **Current cost of total assets at end of 2013** | **=** | **ROI using current-cost estimate** |
|  |  |  |  |  |  |
| St. Louis | $1,314,000 | + | $4,927,600 | = | 26.67% |
| Memphis | $953,454 | + | $5,972,764 | = | 15.96% |
| New Orleans | $913,695 | + | $7,790,556 | = | 11.73% |

3.Adjusting assets to recognize current costs negates differences in the investment base caused solely by differences in construction-price levels. Compared with historical-cost ROI, current cost ROI better measures the current economic returns from the investment. Because the St. Louis assets are older, there is a more significant difference between historical cost and current cost.

**23-30** (30 min.) **Multinational firms, differing risk, comparison of profit, ROI, and RI.**

1.Comparisons of after-tax operating income using translated values:

|  |  |  |  |
| --- | --- | --- | --- |
|  | **U.S.** | **Germany** | **NZ** |
| Operating revenues  ($23,362,940; 6,250,000 eu × $1.50; 5,718,750 NZD × $0.60) | $23,362,940 | $9,375,000 | $3,431,250 |
| Operating expenses  ($18,520,000; 4,200,000 eu × $1.50; 4,250,000 NZD × $0.60) | 18,520,000 | 6,300,000 | 2,550,000 |
| Operating income | 4,842,940 | 3,075,000 | 881,250 |
| Income tax at 40%; 35%; 25% | 1,937,176 | 1,076,250 | 220,313 |
| After-tax operating income | $ 2,905,764 | $1,998,750 | $ 660,937 |

In terms of after-tax operating income, the U.S. division is doing best, with Germany second. The New Zealand division is far behind the other two in terms of operating income.

2. Comparison of ROI for each division.

|  |  |  |  |
| --- | --- | --- | --- |
|  | **U.S.** | **Germany** | **NZ** |
| 1. After-tax operating income | $ 2,905,764 | $ 1,998,750 | $ 660,937 |
| 2. Long-term assets  ($24,214,700; 11,897,321 eu × $1.40; 7,343,744 NZD × $0.75) | $24,214,700 | $16,656,250 | $5,507,808 |
| 3. ROI (Row 1 ÷ Row 2) | 12% | 12% | 12% |

Because of differences in the value of assets employed in each division, they have identical returns on investment despite the differences in after-tax operating income.

3.

|  |  |  |  |
| --- | --- | --- | --- |
|  | **U.S.** | **Germany** | **NZ** |
| After-tax operating income | $ 2,905,764 | $ 1,998,750 | $ 660,937 |
| Long-term assets | $24,214,700 | $16,656,250 | $5,507,808 |
| Cost of capital (given) | 6.5% | 10% | 13% |
| Imputed cost of assets (cost of capital  times long-term assets | $ 1,573,956 | $ 1,665,625 | $ 716,015 |
| Residual income (After-tax operating income less imputed cost of assets) | $ 1,331,808 | $ 333,125 | $ (55,078) |

In contrast to the same ROIs found in each division, the U.S. division is performing the best on the basis of residual income as its return substantially exceeds its cost of capital of 6.5%. Germany has a small positive residual income, while New Zealand’s residual income is negative. These differences are due to differences in the cost of capital across countries. Both Germany and New Zealand achieved the same 12% ROI, but the required rate of return in Germany was just 10%, while that in New Zealand was much higher, at 13%.

4. Comparison of ROI using pre-tax operating income:

|  |  |  |  |
| --- | --- | --- | --- |
|  | **U.S.** | **Germany** | **NZ** |
| 1. Operating income  (from requirement 1) | $ 4,842,940 | $ 3,075,000 | $ 881,250 |
| 2. Long-term assets | $24,214,700 | $16,656,250 | $5,507,808 |
| 3. ROI (Row 1 ÷ Row 2) | 20.00% | 18.46% | 16.00% |

The divisional ranking on the basis of pre-tax ROI is identical to that based on residual income. Note that the ROI computed using pre-tax operating income is much higher than the 12% ROI for all divisions using after-tax income. The differences arise from the different tax rates imposed on each division. The divisions should be compared on after-tax dollars because selling prices and costs in each country reflect different expectations regarding income taxes. For instance, selling prices are likely to be higher in the U..S division, which has the highest tax rate.

**23-31** (30 min.) **ROI, RI, DuPont method, investment decisions, balanced scorecard.**

1.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **2014** | | **ROI =**  **  =** | | | |
| Print  Internet | | 0.90 ($22,500 $25,000)  2.30 ($23,000 $10,000) | | 0.200 ($4,500 ÷ $22,500)  0.030 ($ 690 ÷ $23,000) | 0.180 ($4,500$25,000)  0.069 ($ 690$10,000) |

The Print Division has a relatively high ROI (18%) because of its high income margin relative to Internet. The Internet Division has a low ROI (6.9%) despite a high investment turnover because of its very low income margin.

2. Although the proposed investment is small, relative to the total assets invested, it earns less than the 2014 return on investment (0.180) (All dollar numbers in millions):

2014 ROI (before proposal) =  = 18.00%

Investment proposal ROI =  = 13.95%

2015 ROI (with proposal) =  = 17.62%

Given the existing bonus plan, any proposal that reduces the ROI is unattractive. So, Mays would not wish to take on the new investment, which drops the Print division’s ROI from 18.00% to 17.62%.

3a. Residual income for 2014 (before proposal, in millions):

**Operating Imputed Division**

**Income Interest Charge Residual Income**

Print $4,500 – $2,500 (0.10  $25,000) = $2,000

Internet 690 – 1,000 (0.10  $10,000) = (310)

3b. Residual income for proposal (in millions):

**Operating Imputed Residual**

**Income Interest Charge Income**

$360 – $258 (0.10  $2,580) = $102

Investing in the fast-speed printing press will increase the Print Division’s residual income by $102 million. As a result, if Mays is evaluated using a residual income measure, Mays would be favorably inclined to adopt the computerized reporting and printing system.

4. As discussed in requirement 3b, Mendenhall could consider using RI. The use of RI motivates managers to accept any project that makes a positive contribution to net income after the cost of the invested capital is taken into account. Making such investments will have a positive effect on News Report Group’s customers.

Mendenhall may also want to consider nonfinancial measures such as newspaper subscription levels, internet audience size, repeat purchase patterns, and market share. These measures will require managers to invest in areas that have favorable long-run effects on News Report Group’s customers.

**23-32** (20–30 min.) **Division manager’s compensation, levers of control.**

1 Consider each of the three proposals that Mendenhall is considering:

a. *Compensate managers on the basis of division RI.*

The benefit of this arrangement is that managers would be motivated to put in extra effort to increase RI because managers’ rewards would increase with increases in RI. But compensating managers largely on the basis of RI subjects the managers to excessive risk because each division’s RI depends not only on the manager’s effort but also on random factors over which the manager has no control. A manager may put in a great deal of effort, but the division’s RI may be low because of adverse factors (high interest, recession) that the manager cannot control.

To compensate managers for taking on uncontrollable risk, Mendenhall must pay them additional amounts within the structure of the RI-based arrangement. Thus, using mainly performance-based incentives will cost Mendenhall more money, on average, than paying a flat salary. The key question is whether the benefits of motivating additional effort justify the higher costs of performance-based rewards. The motivation for having some salary and some performance-based bonus in compensation arrangements is to balance the benefits of incentives against the extra costs of imposing uncontrollable risk on the manager.

Finally, rewarding a manager only on the basis of division RI will induce managers to maximize the division’s RI even if taking such actions are not in the best interests of the company as a whole.

b. *Compensate managers on the basis of companywide RI*.

Rewarding managers on the basis of companywide RI will motivate managers to take actions that are in the best interests of the company rather than actions that maximize a division’s RI.

A negative feature of this arrangement is that each division manager’s compensation will now depend not only on the performance of that division manager but also on the performance of the other division managers. For example, the compensation of Mays, the manager of the Print Division, will depend on how well the manager of Internet performs, even though Mays herself may have little influence over the performance of these divisions. Therefore, compensating managers on the basis of companywide RI will impose extra risk on each division manager, and will raise the cost of compensating them, on average.

c. *Compensate managers using the other division’s RI as a benchmark*.

The benefit of benchmarking or relative performance evaluationis to cancel out the effects of common noncontrollable factors that affect a performance measure. Taking out the effects of these factors provides better information about a manager’s performance. What is critical, however, for benchmarking and relative performance evaluation to be effective is that similar noncontrollable factors affect each division. It is not clear that the same noncontrollable factors that affect the performance of the Print Division (cost of newsprint paper, for example) also affect the performance of the Internet division. If the noncontrollable factors are not the same, then comparing the RI of one division to the RI of the other division will not provide useful information for relative performance evaluation.

A second factor for Mendenhall to consider is the impact that benchmarking and relative performance evaluation will have on the incentives for the division managers of the Print and Internet Divisions to cooperate with one another. Benchmarking one division against another means that a division manager will look good by improving his or her own performance, or by making the performance of the other division manager look bad.

2. Using measures like RI and ROI—diagnostic levers of control—can cause managers to cut corners and take other actions that boost short-run performance but harm the company in the long run. Mendenhall can guard against such problems by introducing and upholding strong boundary and belief systems of control within the company. Strict codes of conduct should govern what employees cannot do. Mendenhall should also foster a culture where employees have a deep belief in the value of the company’s journalistic mission.

3. Another potential problem of an excessive focus on diagnostic measures is a myopic disregard for emerging threats and opportunities. Interactive control systems, based on debate and discussion and regular review of strategic uncertainties and the competitive landscape can help overcome this problem. Mendenhall should not only ask for regular reports on ROI, RI, etc., he should meet regularly with division managers, discuss 5- and 10-year strategic plans, and obtain their field-based inputs. Such regular dialogues will help emerging threats and opportunities to surface, as well as the action plans that need to be taken in response.

**23-33** (20 min.) **Executive compensation, balanced scorecard.**

The percentage changes in net income and customer satisfaction in the three business units between 2013 and 2014 are as follows:

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Retail Banking** | **Business Banking** | **Credit Cards** |
| Percentage change in net income  ($3,912,000 − $3,600,000) ÷ $3,600,000;  ($3,940,000 − $3,800,000) ÷ $3,800,000;  ($3,499,000 − $3,550,000) ÷ $3,550,000 | 8.67% | 3.68% | (1.44%) |
| Percentage change in customer satisfaction  (75.48 − 73) ÷ 73; (75.9 − 68) ÷ 68; (78.88 − 67) ÷ 67 | 3.40% | 11.62% | 17.73% |

1. The bonus formula indicates that the executives of the three units will receive the following 2014 bonuses as a percent of salary:

Retail Banking: 8.67% + 3.40% = 12.07% of salary

Business Banking: 3.68% + 11.62% = 15.30% of salary

Credit Cards: 0% + 17.73% = 17.73% of salary

2. The results show an inverse relation between changes in net income and changes in customer satisfaction. When changes in net income are higher, changes in customer satisfaction are lower and vice versa. Some units may be over-investing in customer satisfaction initiatives, causing overall financial performance to decline. However, increases in customer satisfaction are not likely to pay off as immediately as increases in net income, which suggests that some units may be making investments in customer satisfaction to increase long-term financial performance, even though these investments cause short-term net income to decline. The company needs to examine whether one or both of these explanations is true.

3. The board of directors can set targets for changes in both net income and customer satisfaction. This would allow the company to take differences in the units, their competitive environments, and their customers into account when assessing performance. Target setting would also allow the company to reward managers when desirable investments in one dimension lead to short-term declines in the other.

In addition, the board can improve the bonus plan by determining the relative importance of short-term changes in net income and customer satisfaction. Currently, a 1% change in either measure receives the same weight in the bonus formula, and declines have no effect on bonus payouts. However, a 1% increase in one measure may be more valuable than a 1% increase in the other, and declines in either measure may have a bigger effect on long-term value than increases. The payment formula can be modified by putting appropriate (and different) weights on each of these factors.

**23-34** (30 min.) **Financial and nonfinancial performance measures, goal congruence**.

1. Operating income is a good summary measure of short-term financial performance. By itself, however, it does not indicate whether operating income in the short run was earned by taking actions that would lead to long-run competitive advantage. For example, Precision’s divisions might be able to increase short-run operating income by producing more product while ignoring quality or rework. Mendez, however, would like to see division managers increase operating income without sacrificing quality. The new performance measures take a balanced scorecard approach by evaluating and rewarding managers on the basis of direct measures (such as rework costs, on-time delivery performance, and sales returns). This motivates managers to take actions that Mendez believes will increase operating income now and in the future. The nonoperating income measures serve as surrogate measures of future profitability.

2. The semiannual installments and total bonus for the Central Division are calculated as follows:

**Central Division Bonus Calculation**

**For Year Ended December 31, 2014**

|  |  |  |
| --- | --- | --- |
| **January 1, 2014 to June 30, 2014** | | |
| Profitability | (0.02 × $346,500) | $ 6,930 |
| Rework | (0.02  $346,500) – $8,625 | (1,695) |
| On-time delivery | No bonus—under 96% | 0 |
| Sales returns | [(0.015  $3,150,000) – $63,000]  50% | (7,875) |
| Semiannual installment  Semiannual bonus awarded | | $ (2,640)  $ 0 |
| **July 1, 2014 to December 31, 2014** | | |
| Profitability | (0.02 × $330,000) | $ 6,600 |
| Rework | (0.02  $330,000) – $8,250 | (1,650) |
| On-time delivery | 96% to 98% | 1,500 |
| Sales returns | [(0.015  $3,300,000) – $52,500]  50% | (1,500) |
| Semiannual installment  Semiannual bonus awarded | | $ 4,950  $ 4,950 |
| Total bonus awarded for the year | | $ 4,950 |

The semiannual installments and total bonus for the Western Division are calculated as follows:

**Western Division Bonus Calculation**

**For Year Ended December 31, 2014**

|  |  |  |
| --- | --- | --- |
| **January 1, 2014 to June 30, 2014** | | |
| Profitability  Rework  On-time delivery  Sales returns | (0.02 $256,500)  (0.02 $256,500) – $4,500  Over 98%  [(0.015  $2,137,500) – $33,560]  50% | $5,130  0  4,000  (749) |
| Semiannual bonus installment  Semiannual bonus awarded | | $8,381  $8,381 |
|  | |  |
| **July 1, 2014 to December 31, 2014** | | |
| Profitability  Rework  On-time delivery  Sales returns | (0.02 $304,500)  (0.02 $304,500) – $6,000  No bonus—under 96%  [(0.015  $2,175,000) – $31,875] which is greater than zero, yielding a bonus | $ 6,090  0  0  2,500 |
| Semiannual bonus installment  Semiannual bonus awarded | | $ 8,590  $ 8,590 |
| Total bonus awarded for the year | | $16,971 |

3. The manager of the Central Division is likely to be frustrated by the new plan, as the division bonus has fallen by more than $15,000 compared to the bonus of the previous year. However, the new performance measures have begun to have the desired effect––both on-time deliveries and sales returns improved in the second half of the year, while rework costs were also moderately lower. If the division continues to improve at the same rate, the bonus could approximate or exceed what it was under the old plan.

The manager of the Western Division should be at least as satisfied with the new plan as with the old plan, as the bonus is higher. Sales returns decreased slightly, to under the 1.5% benchmark. However, on-time deliveries declined considerably in the second half of the year and rework costs increased. Unless the manager institutes better controls, the bonus situation may not be as favorable in the future. This could motivate the manager to improve in the future, but currently at least, the manager has been able to maintain his bonus without showing improvement in all of the areas targeted by Mendez.

Pedro Mendez’s revised bonus plan for the Central Division fostered the following improvements in the second half of the year despite an increase in sales:

* An increase of 1.9 percentage points in on-time deliveries
* A $375 reduction in rework costs
* A $10,500 reduction in sales returns

However, operating income as a percent of sales has decreased (11% to 10%).

The Western Division’s bonus has remained approximately the same as a result of the following effects:

* An increase of 2.0 percentage points in operating income as a percent of sales (12% to 14%).
* A decrease of 3.6 percentage points in on-time deliveries.
* A $1,500 increase in rework costs.
* A $1,685 decrease in sales returns.

This would suggest that revisions to the bonus plan are needed. Possible changes include the following:

* Increase the weights put on on-time deliveries, rework costs, and sales returns in the performance measures while decreasing the weight put on operating income.
* Create a reward structure for rework costs that are below 2% of operating income that would encourage managers to drive costs lower.
* Review the whole year in total. The bonus plan should carry forward the negative amounts for one six-month period into the next six-month period incorporating the entire year when calculating a bonus; and
* Develop benchmarks and then give rewards for improvements over prior periods and encouraging continuous improvement.

**23-35** (25 min.) **ROI, RI, decision making.**

1. Annual income = 300,000 × ($80 – $48) – $4,000,000 = $5,600,000

Capital charge = 20% × $16,000,000 = $3,200,000

Residual income = $5,600,000 - $3,200,000 = $2,400,000

2. Additional income = 100,000 × ($60 – $48) - $850,000 = $350,000

Additional capital charge = 20% × $2,000,000 = $400,000

Additional residual income = $350,000 – $400,000 = ($50,000)

Munger’s residual income would decrease by $50,000 if the order were accepted.

3. If Munger accepts the order, its performance measures would look as follows:

Annual income = 300,000 × ($80 – $44 – $5.25) – $3,800,000 = $5,425,000

Capital charge = 20% × $15,240,000 = $3,048,000

Residual income = $5,425,000 – $3,048,000 = $2,377,000

Relative to the status quo residual income of $2,400,000 (see requirement 1), accepting this offer lowers Munger’s residual income by $23,000. Munger will therefore decide to make the component in-house rather than buy it externally.

4. The minimum selling price, *p*, is one at which Munger is indifferent to taking on the deal, in the sense that it yields $0 in residual income. The residual income from the deal is given by

15,000 × (*p* – $54) – (20% × $1,500,000)

= 15,000 × (*p* – $54 – $20)

Setting this to equal zero reveals that the minimum selling price is *p* = $74.

5a. At a price of $82, the residual income from the special tempered steel drills is

15,000 × ($82 – $54) – (20% × $1,500,000) = $120,000

The loss in residual income from the lost sales of 6,000 original cordless drills is

6,000 × ($80 – $48) = $192,000.

Overall, Munger’s residual income is reduced by $72,000 ($192,000 – $120,000) as a result of the transaction related to the special tempered steel drills.

5b. For each original drill that Munger does not sell, it loses a residual income (or, equivalently, contribution margin) of $32 per unit ($80 – $48). From requirement 5a, the residual income from the new tempered steel drills is $120,000. Therefore, the drop in unit sales of the regular drill that would leave Munger indifferent to the offer is

 3,750 regular drills.

**23-36** (15 min.) **Ethics, levers of control.**

1. If Stuart Brown “turns a blind eye” toward what he has just observed at the Dallas distribution center, he will be violating the competence, integrity, and objectivity standards for management accountants.

*Competence*

* Perform professional duties in accordance with technical standards.

*Integrity*

* Abstain from engaging in or supporting any activity that would discredit the profession.

*Credibility*

* Communicate information fairly and objectively.
* Disclose fully all relevant information that could reasonably be expected to influence an intended user’s understanding of the reports, analyses, or recommendations.

Brown should:

a. Follow established company policies to bring the issue to the attention of Best management through regular channels; then, if necessary,

b. Discuss the problem with the immediate superior who is not involved in the overstatement of material yield.

c. Clarify relevant ethical issues with an objective advisor, preferably a professional person outside Best.

d. If all the above channels fail to lead to a correction in the organization, he may have to resign and become a “whistle-blower” to bring Best to justice.

2. Best is clearly emphasizing profit, driving managers to find ways to keep profits strong and increasing. This is a diagnostic measure, and over-emphasis on diagnostic measures can cause employees to do whatever is necessary—including unethical actions—to keep the measures in the acceptable range, not attract negative senior management attention and possibly improve compensation and job reviews.

To avoid problems like this in the future, Best needs to establish some strong boundary systems and codes of conduct. There should be a clear message from upper management that unethical behavior will not be tolerated. Best management needs to pay close attention to inspecting inventory for quality when the year-end inventory count is conducted. They should also investigate unusual changes, such as the increase in the Dallas center yield.

Best needs to articulate a belief system of core values. The goal is to inspire managers and employees to do their best, exercise greater responsibility, take pride in their work, and do things the right away.

**23-37** (45 minutes) **RI, EVA, measurement alternatives, goal congruence.**

1.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Spa** | **Operating**  **Income** | **–** | **Required Rate of Return** | **×** | **Investment** | **=** | **Residual Income** |
| Key West | $1,220,000 | **–** | (11% | **×** | 6,155,000) | **=** | $542,950 |
| Phoenix | 1,190,000 | **–** | (11% | **×** | 6,312,000) | **=** | 495,680 |
| Carmel | 1,295,000 | **–** | (11% | **×** | 7,435,000) | **=** | 477,150 |

The residual income from the new saunas would be:

$22,000 operating income – ($225,000 investment ×11% required rate) = ($2,750)

Because the RI of the project is negative, the rate of return on the project is less than the required rate of 11%, and the Key West manager would reject the project. Other managers would also reject the project because they all face a required rate of return of 11%.

2.Refresh Resorts may want to use EVA instead of RI because EVA explicitly takes into consideration both the weighted-average cost of capital and the effect of income taxes. EVA also uses long-term assets and working capital in its calculation as opposed to the use of total assets in the RI calculation. When performance is evaluated using EVA, managers must either earn more after-tax operating income with the same capital, use less capital to earn the same after-tax operating income, or invest capital in high-return projects. EVA is considered a stricter standard by which to gauge performance.

3.WACC =



4.

EVA = After-tax operating income – [WACC × (Total assets – current liabilities)]

Using net book value of assets:

Key West EVA = ($1,220,000 × 65%) – [8.13% × ($6,155,000 – $330,000)]

= $793,000 – $ 473,573

= $ 319,427

Phoenix EVA = ($1,190,000 × 65%) – [8.13% × ($6,312,000 – $265,000)]

= $773,500 – $ 491,621

= $281,879

Carmel EVA = ($1,295,000 × 65%) – [8.13% × ($7,435,000 – $84,000)]

= $841,750 – $597,636

= $244,114

Using gross book value of assets:

Key West EVA = ($1,220,000 × 65%) – [8.13% × ($8,375,000a – $330,000)]

= $793,000 – $654,059

= $138,941

Phoenix EVA = ($1,190,000 × 65%) – [8.13% × ($7,822,000a – $265,000)]

= $773,500 – $614,384

= $159,116

Carmel EVA = ($1,295,000 × 65%) – [8.13% × ($7,655,000a – $84,000)]

= $841,750 – $615,522

= $226,228

aTotal assets + Accumulated depreciation

Using net book value of assets, Key West, the oldest spa, shows the highest EVA, and Carmel shows the lowest. This is understandable, as the Key West assets have been more fully depreciated. This technique, however, can lead management to make false assumptions about the earning power of the Key West spa. Using the gross book value method, Carmel shows the highest EVA, while Key West shows the lowest. This method unmasks the decline in earning power of older spa assets.

5.If Refresh Resorts chooses to use gross book value of assets in its EVA calculation, it may achieve greater goal congruence, as spa managers will be less reluctant otherwise to invest in newer assets that will produce higher future revenue. If a company measures assets using net book value, a manager will reject replacing older, fully depreciated, less profitable assets with newer ones because the initial effect will be lower EVA, even though the replacement may have positive long-term effects for the company.