

Management Control in Decentralized Organizations



This unit should be read as a continuation of the unit # 7. Some of the issues of control of decentralized organizations i.e. introduction to decentralization, segment reporting and transfer pricing have already been included in unit # 7. Still there remain some important issues like “Responsibility Accounting”, “Performance Measures” - ROI, RI, EVA and BSC. Thus this unit designed to fulfil the following objectives:

- (i) to explain the relationship between decentralization and responsibility accounting;
- (ii) to describe the use of ROI and RI and evaluate their suitability; and
- (iii) to explain newly developed techniques of performance measures like EVA and BSC.

Therefore, there will be following three lessons included this unit:

- (a) Decentralization & Responsibility Accounting
- (b) Return on Investment (ROI) and Residual Income (RI)
- (c) Economic Value Added (EVA) and Balanced Scorecard (BSC)

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Lesson-1: Decentralization and Responsibility Accounting

One of the important issues of performance measurement has already been discussed in the previous unit. The issue is segment reporting in decentralized organizations. In this lesson, discussion will be limited to management control system and responsibility accounting.

After completing this lesson, you are expected to be able to:

- To describe a management control;
- To define responsibility accounting;
- To enumerate various responsibility centers; and
- To explain various measures of performance and reporting.

The success of decentralization depends on the effectiveness of the management control system of an organization. And responsibility accounting is one of the important tools of management control. In this lesson, the following issues will be covered:

- (a) Management Control System
- (b) Responsibility Accounting and
- (c) Responsibility Centers

Management Control

Anthony : [1965]

“Management control is the process by which managers assure that resources are obtained and used effectively and efficiently in the accomplishment of the organizations objectives.”

Hofstede : [1981]

‘Management control is a pragmatic concern for results through people.’

Horengren: [2000]

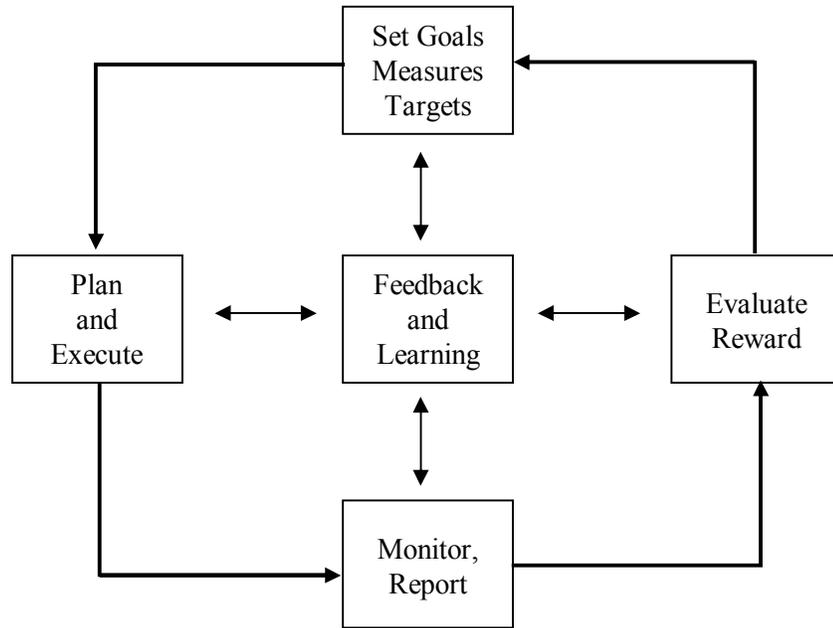
“A management control system is a logical integration of techniques to gather and use information to make planning and control decisions, to motivate employee behavior and to evaluate performance.” The purposes of a management control system are:

- (a) to clearly communicate the organizations goal;
- (b) to ensure that managers and employee understand the specific actions required of them to achieve organizational goals;
- (c) to communicate results of actions across the organizations; and
- (d) to ensure that managers can adjust to changes in the environment.

The Management Control System

Responsibility accounting is one of the important tools of management control.

Management control is the process by which managers assure that resources are obtained and used effectively and efficiently in the accomplishment of the organizations objectives.



Source: *Horngren*

The above exhibit shows “that top managers set organization-wide goals, performance measures and targets. Managers review these goals on a periodic basis, usually once a year. These goals provide a framework around which an organization will form its comprehensive plan for positioning itself in the market. Goals without performance measures do not motivate managers.”

The management control model includes the following main elements:

- (a) *Goals and objectives*: Statements of organizational purpose or desired achievement.
- (b) *Situational Contingencies*: Characteristics of an organization, such as size, or factors that have an impact on an organization.
- (c) Components of the management control system—elements that make up the management control system, such as the number of reports, the relative degree of detail of those reports, and the length of the reporting cycle.’
- (d) Performance: accomplishments of the organization.
- (e) *Output to be assessed*: Specific elements of performance that are identified and incorporated into the management control system.
- (f) *Attributes measured or performance measure*: Characteristics of outputs that identified for purposes of evaluation.

Anthony, Dearden and Bedford

Distinction among Management, Accounting and Task Control

| Characteristics | Management Control | Accounting Control | Task Control |
|----------------------------|---|---|---|
| Focus of Activity | Whole operation | Errors and Irregularities | Single task or transaction |
| Scope | Broad & Inclusive | Corrective action | according to specific rule |
| Purpose | Describe management opportunities | Describe accounting & auditing responsibility | Describe specific performance relative to specific standard |
| Nature of structure | Psychological | Systematic | Rational |
| Nature of information | Integrated, financial, approximation, acceptable, future & historical | Articulated model, objective financial data, historical | Tailor made to the operation, often non-financial, precise |
| Persons primarily involved | Management | Accountants | Supervisors |
| Source discipline | Psychology | Economics | Engineering |
| Time horizon | Weeks, months, year | Months, quarter, year | Day to Day |

Responsibility Accounting

Christopher Nobes:

Responsibility accounting is ‘a system of control within an organization whereby individual managers at all levels are held responsible for specific costs and, perhaps, revenue.’

Kohler’s Disctionary:

Responsibility accounting is “a method assigning costs to organization units. The purpose is to secure control at the point where costs are incurred instead of assigning them all to products and processes remove from the point of incurrence.”

Horngren:

Responsibility accounting refers to “identifying what parts of the organization have primary responsibility for each action, developing measures and targets to achieve and creating reports of these measures by organization subunits or responsibility center”.

Garrison & Noreen:

“The basic idea behind responsibility accounting is that a manager should be held responsible for those items - only those items - that the manager can actually control to a significant extent.”

J. Lal:

Responsibility accounting' refers to the accounting process that reports how well managers of responsibility centers have fulfilled their responsibility.

“The term ‘responsibility accounting’ refers to the accounting process that reports how well managers of responsibility centers have fulfilled their responsibility. Also known as activity or profitability accounting, it is an information system that personalizes control reports by accumulating and reporting costs and revenue information according to defined responsibility centers within a company. Responsibility accounting systems are tailored to the organization structure so that revenue and costs are accumulated and reported by centers of responsibility within the organization.”

Assumptions:

The responsibility accounting system makes the following important assumptions:

- (i) The areas of responsibility are defined for which managers should be held responsible.
- (ii) Managers are only charged with the items and responsibility over which they can exercise a significant degree of direct control.
- (iii) Managers should actively participate in establishing the goals or budgets against which their performance is measured.
- (iv) Goals defined for each area of responsibility should be attainable with effective and efficient performance.
- (v) Control (performance) reports should contain significant information related to each area of responsibility.
- (vi) Responsibility centre managers should try to accomplish the budgets and objectives established for their respective areas of responsibility.

Responsibility Accounting & Controllability

Responsibility accounting is closely related with the goal of controllability. Accordingly,

- (a) Responsibility accounting implies that individuals in an organization cannot be responsible for those items which they cannot control. They should also not claim any authority over those revenues which are not the result of their actions and performance.
- (b) Those decision makers who are placed higher in the authority hierarchy, are held responsible for a greater number of activities and financial elements.

Responsibility Centre

Christopher Nobes:

Responsibility centre is ‘a section of an organization for which an individual manager is held to account in terms of its costs and revenue.’

Kohler:

Responsibility centre is “any organizational unit accountable to higher authority for performance of assigned functions, usually including its incurrence of specified costs under budget limitations and control.”

Horngren:

‘A responsibility centre is a set of activities and resources assigned to a manager, a group of managers, or other employees. A set of machines and machining activities may be a responsibility centre for a production supervisor. The full production department may be a responsibility centre for the department head. Finally, the entire organization may be a responsibility centre for the president.’

A responsibility centre is simply, a segment of of the business whose manager is accountable for specified set of activities. There are four types of responsibility centers as stated below:

(a) Cost Centre; (b) Revenue Centre; (c) Profit Centre; and (d) Investment Centre.

Cost Centre

A cost centre is a responsibility centre in which a manager is accountable for costs only. Its financial responsibilities are to control and report costs. Cost centres are often found in most manufacturing concerns where inputs, such as direct materials and direct labour can be specified for each output. The production departments of manufacturing plants are usually cost centres. This concept can also be used in non-manufacturing concern.

Discretionary Cost Centre

A discretionary cost centre is an organizational sub-unit whose manager is held accountable for cost, but the sub-units input-ouput relationship is not well specified. Examples of discretionary cost centers include legal, accounting, research and development, advertising, marketing and numerous other administrative departments.

Revenue Centre

A revenue centre is a segment of the organization which is primarily responsible for generating revenue. The manager of a revenue centre is held accountable for the revenue attributed to the unit. The performance of a revenue centre is evaluated by comparing the actual revenue with budgeted revenue, and actual marketing expenses with budgeted marketing expenses. The marketing manager of a product line and sales representative are examples of revenue centres.

Responsibility centre is ‘a section of an organization for which an individual manager is held to account in terms of its costs and revenue.’

A cost centre is a responsibility centre in which a manager is accountable for costs only.

A revenue centre is a segment of the organization which is primarily responsible for generating revenue. The manager of a revenue centre is held accountable for the revenue attributed to the unit

Profit Centre

A profit centre is an organizational sub-unit whose manager is held responsible for profits.

A profit centre is an organizational sub-unit whose manager is held responsible for profits. Since profit is the excess of revenues over expenses, profit centre managers are held accountable for both the revenue and expenses attributed to their subunit. Profit centre managers aim at both production and marketing of a product. In this situation, profit centre managers determine the selling price, marketing programmes and production policies. Profit centres make managers more concerned with finding ways to increase the center's revenue by increasing production or improving distribution channels. The manager of a profit centre does not make decisions concerning the plant assets available to the centre. Most profit centers are created in an organization in which they sell products and services outside the company. In some cases, profit centers may sell products and services within the company. Here, the issue of transfer pricing may arise.

Investment Centre

An investment centre is "a responsibility centre whose success is measured not only by its income but also by relating that income to its invested capital."

An investment centre is "a responsibility centre whose success is measured not only by its income but also by relating that income to its invested capital as in a ratio of income to the value of capital employed." (Horngren). Thus the investment centre manager has control over revenues, expenses and the amounts invested in the centre's assets. Areas controlled by an investment centre manager are:

- (i) Costs; (ii) Revenues; (iii) Credit policy; (iv) Inventory policy; (v) Investment in centre's assets.

Performance Reports

Performance is the act of performing. For better control performance of any organizational segment should be measured and compared with the expected results. The well-designed management control system develops and reports both financial and non-financial measures of performance. Good performance measures will:

- (i) Relate to the goals of the organization;
- (ii) Balance long-term and short-term concerns;
- (iii) Reflect the management of key actions and activities;
- (iv) Be affected by actions of managers and employees;
- (v) Be readily understood by employees;
- (vi) Be used in evaluating and rewarding managers and employees;
- (vii) Be reasonably objective and easily measured;
- (viii) Be used consistently and regularly.

Responsibility reporting has two purposes.

Responsibility performance reporting implies the reporting phase of responsibility accounting. Responsibility reporting has two purposes:

- (a) To determine the degree of performance in the area of responsibility for which the manager is directly responsible.
- (b) To formulate measures to improve the performance of the responsibility manager.

The responsibility reporting should be suitable and relevant with respect to content, frequency of reporting and level of details required.

Content : Only those items that are controlled by the particular responsibility centre manager should be reported

Frequency : Lower the level of the responsibility centre, the higher will be the frequency.

Details : Requirements will determine the details of the report.

Usry and Hammer have mentioned the following as characteristics of responsibility reporting:

- (1) Reports should fit the organization chart, that is the report should be addressed to the individual responsible for the items covered by it, who, in turn will be able to control those costs under his jurisdiction. Managers must be educated to use the results of the reporting system.
- (2) Report should be prompt and timely. Prompt issuance of a report requires that cost records be organized so that information is available when is needed.
- (3) Reports should be issued with regularity. Promptness and regularity are closely tied up with the mechanical aids used to assemble and issue reports.
- (4) Reports should be easy to understand. Often they contain accounting terminology that managers with little or no accounting training find difficult to understand and vital information may be incorrectly communicated. Therefore, accounting terms should be explained or modified to fit the user. Top management should have some knowledge of the kind of items chargeable to an account as well as the methods used to compute overhead rates, make cost allocations, and analyse variances.
- (5) Reports should convey sufficient but not excessive details. The amount and nature of the details depend largely on the management level receiving the report. Reports to management should neither be flooded with immaterial facts or so condensed that management lacks vital information essential to carrying out its responsibilities.
- (6) Reports should give comparative figures, i. e., a comparison of actual with budgeted figures or of predetermined standards with actual results and the isolation of variances.
- (7) Reports should be analytical. Analysis of underlying papers, such as time tickets, scrap tickets, work orders, and materials requisitions, provide reasons for poor performance which might have been due to power failure, machine breakdown, an inefficient operator, poor quality of materials, or many other similar factors.
- (8) Reports for operating management should, if possible, be stated in physical units as well as in terms of money since monetary information may give a foreman not trained in the language of the accountant a certain amount of difficulty.

- (9) Reports may tend to highlight departmental efficiencies and inefficiencies, result achieved future goals or targets.

Responsibility by nature of centres:

- (a) Responsibility Reporting for Cost Centre; and
 (b) Responsibility Reporting for Profit Centre

Responsibility Reporting for Cost Centres

A specimen of responsibility performance reporting for cost centers is given below which has been designed to provide relevant cost information to three levels of responsibility centres in a manufacturing enterprise- Foreman, Production Manager, General Manager.

Responsibility Report for Cost Centres

(A) Foreman (Paint Section)

| <i>Item</i> | <i>Actual Cost (Tk.)</i> | <i>Budgeted Cost (Tk.)</i> | <i>Variance (Tk.)</i> |
|------------------|------------------------------|--------------------------------|---------------------------|
| Direct materials | 50,000 | 48,400 | (-) 1,600 |
| Direct labour | 31,000 | 34,000 | (+) 3,000 |
| Indirect labour | 12,000 | 12,000 | - |
| Supplies | 1,000 | 1,600 | (+) 600 |
| | 94,000 | 96,000 | (+) 2,000 |

(B) Production Manager

| <i>Item</i> | <i>Actual Cost (Tk.)</i> | <i>Budgeted Cost (Tk.)</i> | <i>Variance (Tk.)</i> |
|------------------|------------------------------|--------------------------------|---------------------------|
| Paint Section | 94,000 | 96,000 | (+) 2,000 |
| Cleaning Section | 1,20,000 | 1,21,000 | (+) 1,000 |
| Assembly Section | 1,61,000 | 1,58,000 | (-) 3,000 |
| | 3,75,000 | 3,75,000 | 0 |

(C) General Manager

| <i>Item</i> | <i>Actual Cost (Tk.)</i> | <i>Budgeted Cost (Tk.)</i> | <i>Variance (Tk.)</i> |
|-----------------------|------------------------------|--------------------------------|---------------------------|
| Production department | 3,75,000 | 3,75,000 | (-) |
| Sales department | 3,74,000 | 3,80,000 | (+) 6,000 |
| Office administration | 1,10,000 | 1,12,000 | (+) 2,000 |
| Interest on loans | 15,000 | 15,000 | - |
| | 8,74,000 | 8,82,000 | (+) 8,000 |

Form the statement above, it can be found that each responsibility report contains items and information which are required by the concerned responsibility centre manager and which are within his responsibility area.

For example, in the foreman's report, relevant production cost information is given. In the responsibility report prepared for the production manager, information on different sections of his department is included in aggregated manner and for the general manager, the responsibility report contains information for different departments. It can be further noticed that responsibility reporting goes on aggregating information as the reports are prepared for higher level managers in the organisational hierarchy. That is, the amount of detail decreases as reports reach higher and higher levels of management. Managers cannot make effective use of information that is too detailed and voluminous. Departmental managers do not routinely receive reports detailing all of the costs of the work centres. Managers who want such detailed information can get it and might well seek it if they were concerned about some particular elements of cost.

Responsibility Reporting for Profit Centres

Responsibility accounting reports for profit centres are normally in the form of income statements. The principle of controllability also applies to responsibility reporting for profit centres. The statement below gives a sample of responsibility report for profit centres organised on the basis of product lines and geographical areas. Managers at the lowest level of profit centre are responsible for product lines. They are subordinate to the managers of the geographical areas, who are, in turn, responsible to the Managing Director of the company.

Responsibility accounting reports for profit centres are normally in the form of income statements.

Profit centre reporting can be prepared in a different manner to provide more detail on individual components of the appliance segment in the particular region. An alternative responsibility reporting format giving information on different categories of appliances is also given. For simplicity, budgeted figures are omitted. The critical point in responsibility reporting is conveying the best information: the selection of the elements to include and the format are secondary.

Responsibility Reports for Profit Centres (Thousands of Taka)

| | <u>Current Month</u> | | <u>Year to Date</u> | |
|--|----------------------|----------------|---------------------|----------------|
| | <i>Budget</i> | <i>(Under)</i> | <i>Budget</i> | <i>(Under)</i> |
| Report to Product Manager - Appliances, Asian Region | | | | |
| Sales | 122.00 | 1.5 | 387.0 | 3.2 |
| Variable costs: | | | | |
| Production | 47.5 | 2.8 | 150.7 | 5.9 |
| Selling and administrative | 12.2 | 1.8 | 38.7 | 1.9 |
| Total variable costs | 59.7 | 4.6 | 189.4 | 7.8 |
| Contribution margin | 62.3 | (3.1) | 197.6 | (4.6) |
| Direct fixed costs | (36.0) | (1.2) | (98.5) | (3.1) |

| | | | | |
|---|------|-------|-------|-------|
| Product margin | 26.3 | 1.9 | 99.1 | 7.7 |
| Report to Manager- Asian Region | | | | |
| product margins: | | | | |
| Appliances | 26.3 | (1.9) | 99.1 | (1.5) |
| Industrial equipment | 37.4 | 3.2 | 134.5 | 7.3 |
| Tools | 18.3 | 1.1 | 59.1 | (2.0) |
| Total Product margins | 82.0 | 2.4 | 292.7 | 3.8 |
| Regional expenses (common to all product lines) | 18.5 | 0.8 | 61.2 | (1.3) |
| Regional margin | 63.5 | 1.6 | 231.5 | 5.1 |
| Report to executive Vice President | | | | |
| Regional margins: | | | | |
| Asian | 63.5 | 1.5 | 231.5 | 5.1 |

| | | | | |
|--|-------|-------|---------|--------|
| European | 78.1 | (4.3) | 289.4 | (8.2) |
| USA | 211.8 | (3.2) | 612.4 | (9.6) |
| Total regional margins | 353.4 | (5.9) | 1,133.3 | (12.7) |
| Corporate expenses (common to all regions) | 87.1 | 1.4 | 268.5 | 3.1 |
| Corporate profit | 266.3 | (7.3) | 864.8 | (15.8) |

Alternative Responsibility Reporting Formal

Report to Product manager - Appliances, Asian Region (thousands of Taka)

| | <i>Total (Tk.)</i> | <i>Small Home Appliances (Tk.)</i> | <i>Large Home Appliances (Tk.)</i> | <i>Commercial Appliances (Tk.)</i> |
|--|--------------------|------------------------------------|------------------------------------|------------------------------------|
| Sales | 390.2 | 126.3 | 109.5 | 154.4 |
| Variable costs: | | | | |
| Production | 156.6 | 41.1 | 31.2 | 84.3 |
| Selling and administrative | 40.6 | 14.2 | 18.1 | 8.3 |
| total variable costs | 197.2 | 55.3 | 49.3 | 92.6 |
| Contribution margin | 193.0 | 71.0 | 60.2 | 61.8 |
| Direct fixed cost | 27.4 | 9.5 | 11.2 | 6.7 |
| Margin | 165.6 | 61.5 | 49.0 | 55.1 |
| Costs common to products in the appliance line | <u>68.0</u> | | | |
| Production margin | 97.6 | | | |

Example # 1

Starlight manufactures ready-made garments by a simple process of cutting the clothes in various shapes and sewing the corresponding pieces together to form the finished products.

The Sewing Department and the Cutting Department report to the Production Manager who along with Engineering Manager reports to the Director-Manufacturing. The Sales Manager, Publicity Manager and the Credit Manager report to the Managing Director of the Company

The Accounts Department reports the following for the last quarter of 2008:

| | Budgeted (Tk.) | Actual (Tk.) |
|---|-------------------|-----------------|
| Bad Debt Losses | 5,000 | 3,000 |
| Cloth used | 31,000 | 36,000 |
| Advertising | 4,000 | 4,000 |
| Audit Fees | 7,500 | 7,500 |
| Credit Reports | 1,200 | 1,050 |
| Sales Representative: | | |
| Travelling Expenses | 9,000 | 10,200 |
| Sales Commission | 7,000 | 7,000 |
| Cutting Labour | 6,000 | 6,600 |
| Thread | 500 | 450 |
| Sewing Labour | 17,000 | 18,400 |
| Credit Dept. Salaries | 8,000 | 8,000 |
| Cutting Utilities | 800 | 700 |
| Sewing Utilities | 900 | 950 |
| Director Marketing salaries & Admin. Exp. | 20,000 | 21,400 |
| Production Engineering Expenses | 13,000 | 12,200 |
| Sales Management Office Expenses | 16,000 | 15,700 |
| Production Manager Office Expanses | 18,000 | 17,000 |
| Director- Manufacturing Salaries & Admn. Expenses | 21,000 | 20,100 |

Using the above data, prepare responsibility accounting reports for the Director-Marketing, the Director-Manufacturing and the production Manager.

Solution:

Responsibility Accounting Reports

| | Budgeted (Tk.) | Actual (Tk.) | Variance (Tk.) | |
|------------------------------------|-------------------|-----------------|-------------------|----------------|
| For the Production Manager | | | | |
| Cutting Department: | | | | |
| Cloth | 31,000 | 36,000 | 5,000 | (Unfavourable) |
| Cutting labour | 6,000 | 6,600 | 600 | (Unfavourable) |
| Cutting Utilities | 800 | 700 | 100 | (Favourable) |
| Total Cutting Dept (A) | 37,800 | 43,300 | 5,500 | (Unfavourable) |
| Sewing Department: | | | | |
| Thread | 500 | 450 | 50 | (Favourable) |
| Sewing Labour | 17,000 | 18,400 | 1,400 | (Unfavourable) |
| Sewing Utilities | 900 | 950 | 50 | (Unfavourable) |
| Total Sewing Dept. (B) | 18,400 | 19,800 | 1,400 | (Unfavourable) |
| Total (A + B) | 56,200 | 63,100 | 6,900 | (Unfavourable) |
| For the Director - Manufacturing | | | | |
| Production Department* | 56,200 | 63,100 | 6,900 | (Unfavourable) |
| Production Engineering Expenses | 13,000 | 12,200 | 800 | (Favourable) |
| Production Manager-Office Expenses | 18,000 | 17,000 | 1,000 | (Favourable) |
| Total | 87,200 | 92,300 | 5,100 | (Unfavourable) |

(*As per Responsibility Accounting Report for the Production Manager)

For the Director - Marketing

| | | | | |
|-----------------------|-------------|-------------|-------------|----------------|
| Sales Representative: | <u>Taka</u> | <u>Taka</u> | <u>Taka</u> | |
| Travelling Expenses | 9,000 | 10,200 | 1,200 | (Unfavourable) |
| Sales Commission | 7,000 | 7,000 | - | |
| Total (A) | 16,000 | 17,200 | 1,200 | (Unfavourable) |
| Sales Management: | | | | |
| Office Expenses (B) | 16,000 | 15,700 | 300 | (Favourable) |
| Advertising (C) | 4,000 | 4,000 | - | |
| Credit Department: | | | | |
| Salaries | 8,000 | 8,000 | - | |
| Credit Reports | 1,200 | 1,050 | 150 | (Favourable) |
| Bad Debt Losses | 5,000 | 3,000 | 2,000 | (Favourable) |
| | 14,200 | 12,050 | 2,150 | |
| Total (A + B + C + D) | 50,200 | 48,950 | 1,250 | (Favourable) |

Example # 2

A manufacturing company has five plants A, B, C, D and E. Each plant has a forming, cleaning and packing department.

Each level of management has responsibility over costs incurred at its level.

The budget for the current year has been set up as follows:

| <i>Plant</i> | <i>Budgeted cost (Taka)</i> |
|--------------|---------------------------------|
| A | 67,500 |
| B | 61,250 |
| C | 54,200 |
| D | 67,500 |
| E | 67,500 |

Budgeted information for Plant C is as follows:

| | |
|------------------------|--------|
| Plant Manager's Office | 1,175 |
| Forming department | 15,000 |
| Cleaning department | 27,725 |
| Packing department | 10,300 |

Budgeted information for Plant C forming department is as follows:

| | |
|------------------|-------|
| Direct materials | 4,167 |
| Direct labour | 7,500 |
| Factory overhead | 3,334 |

The following additional budgeted data are available:

| | |
|--------------------------------------|--------|
| President Office | 8,125 |
| Vice-President, Marketing | 10,000 |
| Vice-President, Manufacturing Office | 2,084 |

The following actual costs are incurred during the year:

| <i>Plant</i> | <i>Actual cost (Taka)</i> |
|--------------|-------------------------------|
| A | 63,825 |
| B | 62,150 |
| C | 54,238 |
| D | 65,550 |
| E | 68,400 |

The actual cost for Plant C (Forming Department) were as follows:

| | | |
|------------------|-------|--------------|
| Direct materials | 167 | under budget |
| Direct labour | 2,000 | under budget |
| Factory overhead | 167 | over budget |

Actual costs for Plant C (Plant Manager) were:

| | |
|------------------------|--------|
| Plant Manager's Office | 1,238 |
| Cleaning Department | 28,750 |
| Packing Department | 11,250 |
| Forming Department | 13,000 |

Actual costs for the President's level were:

| | |
|-------------------------------|----------|
| President, Office | 8,188 |
| Vice-President, Marketing | 14,900 |
| Vice-President, Manufacturing | 3,16,658 |

Prepare a responsibility report for the year showing the details of the budgeted, actual and variance amounts for the following areas:

- Level 1 Forming department, Plant C
- Level 2 Plant Manager, Plant C
- Level 3 Vice-President, Manufacturing
- Level 4 President

Solution:

Responsibility Report

| | Budgeted (Tk.) | Actual (Tk.) | Variance (Tk.) |
|--|---------------------------|-------------------------|---------------------------|
| President (level 4) | 8,125 | 8,188 | 63 |
| President's office | 10,000 | 14,900 | 4,900 |
| Vice-President, Manufacturing | 3,20,034 | 3,16,658 | (3,376) |
| Total controllable costs | 3,38,159 | 3,39,746 | 1,587 |
| Vice-President, Manufacturing: (level 3) | | | |
| Vice-President, Manufacturing Office | 2,084 | 2,495 | 412 |
| Plant A | 67,500 | 63,825 | (3,675) |
| Plant B | 61,250 | 62,150 | 900 |
| Plant C | 54,200 | 54,238 | (38) |
| Plant D | 67,500 | 65,550 | (1,950) |
| Plant E | 67,500 | 68,400 | 900 |
| Total controllable costs | 3,20,034 | 3,16,658 | (3,376) |
| Plant Manager, Plant C (level 2) | | | |
| Plant Manager's Office | 1,175 | 1,238 | 63 |
| Forming department | 15,000 | 13,000 | (2,000) |
| Cleaning department | 27,725 | 28,750 | 1,025 |
| Packing department | 10,300 | 11,250 | 950 |
| Total controllable costs | 54,200 | 54,238 | 38 |
| Forming department, Plant C (level 1) | | | |
| Direct materials | 4,167 | 4,000 | (167) |
| Direct labour | 7,500 | 5,500 | (2,000) |
| Factory overhead | 3,333 | 3,500 | 167 |
| Total controllable costs | 15,000 | 13,000 | (2,000) |

Measures of Divisional Performance:

The following measures are generally used to evaluate a division's performance:

(a) Cost Centre:

Cost Variance Analysis for each element of cost:

- Direct Material Variances : (i) Quantity Variance
(ii) Mix Variance &
(iii) Price Variance
- Direct Labour Variances : (i) Efficiency Variance
(ii) Gang Variance
(iii) Rate Variance
- Overhead Variances : (i) Efficiency Variance
(ii) Capacity Variance
(iii) Spending Variance

[These variances are explained in Standard Costing Unit and Flexible Budget unit.]

(b) Revenue Centre:

Revenue Variances:

(1) Contribution basis : [May not be used in a strictly revenue centre)

- (i) Quantity Variance
- (ii) Mix Variance
- (iii) Rate Variance

(2) Absolute Price basis:

- (i) Quantity Variance
- (ii) Mix Variance
- (iii) Price Variance

(c) Profit Centre:

(1) Division Contribution or Segment Contribution [Discussed in segment reporting unit)

(2) Division's Net Profit [Absolute]

Variance : Budgeted Net Profit – Actual Net Profit

Further explanation of variances:

- (i) All cost variances
- (ii) All revenue variances

(d) Investment Centre

(1) Return on Investment (ROI)

$$\text{ROI} = \frac{\text{Divisional Profit}}{\text{Divisional Investment}}$$

(2) Residual Income (RI)

RI = Divisional Net Profit - (% Capital Charge × Divisional Investment)

(3) Economic Value Addition (EVA)

School of Business

$$\text{EVA} = \text{Adjusted After-tax operating Income} - \text{Cost of Invested Capital} \\ (\%) \times \text{Adjusted average investment capital}$$

[These will be discussed in details in the next lesson.]

Lesson-2: Return on Investment (ROI) and Residual Income (RI)

One of the critical issues of decentralized type of management is to measure the performance of decentralized units. Nature of decentralized units, organizations' goal and nature of delegated authority will determine the type of measures to be used. This lesson will be devoted to explain the measures applicable to an investment centre.

After completing this lesson, you are expected to be able to:

- To explain various types of performance measures
- To describe ROI and to identify its limitations;
- To describe RI

When companies decentralize decision making, they maintain control by organizing responsibility centres, developing performance measures for each, and basing rewards on an individual's performance at controlling the responsibility centre.

Performance measures are developed to provide some direction for managers of decentralized units and to evaluate their performance. The development of performance measures and specification of rewards are major issues of decentralized organizations. Because performance measures can affect the behavior of managers, the measures chosen should encourage a high degree of goal congruence. In other words, they should influence managers to pursue the company's objectives.

Types of Performance Measurements

| Types of Measures of Performance | Description | Responsibility Centres |
|---|--|------------------------|
| Measurement of cost of goods produced or service rendered | (i) Statement of cost of production (ii) Variance Analysis <ul style="list-style-type: none"> • Total Cost Variance • Element-wise cost variance [Material, Labour, Overhead variances] | Cost Centre |
| Measurement of revenue earned | (i) Product / Service-wise Revenue statement (ii) Variance Analysis [Quantity, Mix and Price Variance] | Revenue Centre |
| Measurement of profits | (i) Contribution Margin Statement (ii) Net Profit Statement | Profit Centre |
| Measurement of profitability | (i) Return on investment (ii) Residual Income (iii) Economic Value Added | Investment Centre |

There are three performance measures for investment centres. These are (i) Return on Investment, (ii) Residual Income and (iii) Economic Value

Added.

Return on Investment (ROI)

Definition:

Kohler:

ROI is “an overall, ultimate, ratio measure of the profits achieved by a firm through its basic operations. It is considered a useful indicator of management’s general effectiveness and efficiency.”

Different Versions of ROI

- (i) ROI is the ratio of net income to total assets.
- (ii) ROI is the ratio of net income before interest and taxes and total assets.
- (iii) ROI is the ratio of “The sum of net income after taxes and after tax interest” and total assets.
- (iv) ROI is the product of profit margin and total assets turnover.

Hansen & Mowen:

ROI can be defined in the following three ways:

$$\begin{aligned}\text{ROI} &= \text{Operating Income} \div \text{Average Operating Assets} \\ &= (\text{Operating Income} \div \text{Sales}) \times (\text{Sales} \div \text{Average Operating Assets}) \\ &= (\text{Operating Income Margin} \times \text{Operating Asset Turnover})\end{aligned}$$

Hilton, Maher & Selto:

ROI for an investment centre is the income divided by its invested capital.

$$\text{ROI} = \text{Income} \div \text{Investment}$$

Definitions of “Net Operating Income” and “Operating Assets”:

Net Operating Income:

Garrison

“Net Operating Income”, rather than net income is used in the ROI formula.

“Net Operating income” is income before interest and taxes and is sometimes referred to as EBIT (earnings before interest and taxes). Net operating income is used in the formula because the base (i.e. denominator) consists of operating assets.

Operating Assets:

Garrison

“Operating assets include cash, accounts receivable, inventory, plant and equipment, and all other assets held for productive use in the organization.”

Non-operating Assets

‘Non-operating assets include land held for future use, an investment in

Plant & Equipment : [Gross Book Value Versus Net Book Value]

Plant and equipment constitute a major portion of operating assets of most of manufacturing concerns. It is debatable whether to use gross value or net value of plant and equipment in measuring operating assets in calculating ROI.

Arguments for Using Net Book Value to Measure Operating Assets in ROI Computations:

- (i) The net books value method is consistent with how plant and equipment are reported on the balance sheet (cost less accumulated depreciation to date).
- (ii) The net book value method is consistent with the computation of operating income which includes depreciation as an operating expense.

Arguments for using Gross Cost to measure Operating Assets in ROI Computation:

- (i) The gross cost method eliminates both the age of equipment and the method of depreciation as factors in ROI computations. [Under the net book value method, ROI increases over time as net book value declines due to depreciation.]
- (ii) The gross cost method does not discourage replacement of old, worn-out equipment with new equipment. [Under the net book value method, replacing fully depreciated equipment with new equipment can have a dramatic adverse effect on ROI.]

It is observed that a majority of companies use the net book value approach in ROI computations. [Garrison].

David Solomon's Suggestions for ROI Calculation

“For the purpose of rate of return analysis, “investment” shall be defined in accordance with the following rules:

1. Total investment is best defined in most situations as total assets. To determine controllable investment, a deduction must be made for controllable liabilities. The extent to which investment in fixed assets can be regarded as controllable by divisions must depend on the degree of autonomy which divisions enjoy.
2. Fixed assets should be included in the computation of investment, for the present purpose, at cost. The recognition, by means of index number adjustments, of the effect of changes in the value of the dollar on asset values is desirable but is seldom practiced.
3. Fixed assets held as corporate assets should not be allocated between divisions for inclusion in their computations of investment. The allocation of portions of a centrally held bank balance to divisions is appropriate, if a basis which really reflects their incremental cash

demands can be found. The allocation of centrally held receivables, on the basis of a number of days sales where direct allocation to divisions is not possible, is also appropriate in recognition of the additional financing a division's receivables require. These allocated assets form part of a division's total investment but not of its controllable investment.

4. The investment in a division's inventory is generally controllable investment. It should be valued on a FIFO basis, any adjustment to bring it to a LIFO basis being treated as a nondivisional adjustment.
5. In calculating the rate of return for a quarter, or for any shorter period, the investment at the beginning of that period is suitable as the base. For a longer span of time, an average investment figure should be used.
6. For evaluating managerial performance, if the rate of return is to be used, the percentage of controllable operating profit to controllable investment is the most appropriate way of defining it. For evaluating the over-all performance of the division's business, the relationship between net residual income plus interest and the total investment in the division is more suitable.
7. The before-tax rate of return is more appropriate for judging the performance of the division's management, whereas the after-tax rate is more appropriate for judging the results of the division's business."

Example # 1

A merchandise firm sells its goods through department stores and discount houses which it has set up for operating sales. The ROIs of both businesses have to be calculated from the following data:

| | Department Store (Tk.) | Discount Houses (Tk.) |
|-----------------------|---------------------------|--------------------------|
| Divisional profit | 20,000 | 32,000 |
| Divisional Investment | 1,00,000 | 160,000 |
| Divisional Sales | 2,00,000 | 480,000 |

Solution:

| Measures | Formula | Departmental Store | Discount Houses |
|-----------------------------|--|--|--|
| Profit margin on Sales | $\frac{\text{Divisional profit}}{\text{Divisional sales}}$ | $\frac{\text{Tk.20,000}}{\text{Tk.200,000}} \times 100 = 10\%$ | $\frac{\text{Tk.32,000} \times 100}{480,000} = 6.67\%$ |
| Investment (Asset) Turnover | $\frac{\text{Divisional Sales}}{\text{Investment}}$ | $\frac{\text{Tk.200,000}}{100,000} = 2$ | $\frac{\text{Tk.480,000}}{\text{Tk.160,000}} = 3$ |
| Return on Investment | Margin \times Investment | $10\% \times 2 = 20\%$ | $6.6666 \times 3 = 20\%$ |

| | | | |
|--|----------|--|--|
| | Turnover | | |
|--|----------|--|--|

Both the divisions have the same ROI. That means that they are equally profitable. Discount houses have Tk.12,000 more profit than the departmental store. But the discount houses have lower rate of profit margin on sales. Discount houses have lower investment than the department store, with a higher asset turnover. Ultimately both the outlets have the same ROI.

ROI can be increased by any of the following actions, all other factors being held constant:

- (i) An increase in sales price or sales volume;
- (ii) A decrease in operating costs; and
- (iii) A reduction in divisional investment.

Example # 2

The Angel Company has several divisions. Of these three divisions (Globe, Universe and Enterprise) all are in mature industries. Data for these divisions appear below (in millions of Taka).

| | Divisions | | |
|-----------------------------------|-----------|----------|------------|
| | Globe | Universe | Enterprise |
| Sales | Tk.320 | Tk.450 | Tk.1,200 |
| Income | 32 | 40 | 90 |
| Investment | 160 | 240 | 600 |
| Depreciation (included in income) | 20 | 30 | 80 |

Current assets and liabilities remain fairly constant from year to year. Angel Company requires a minimum ROI of 10 percent.

Required:

- (i) Rank the divisions in order of their contribution to the firm, at least using three different criteria.
- (ii) Choose the one ranking criterion that you believe to be the best and justify.

Solution:

| Divisions | Income Basis | | Margin | | ROI | |
|------------|---------------|------|------------|------|--------|------|
| | Income Figure | Rank | % of Sales | Rank | ROI | Rank |
| Globe | 32.00 | 3 | 10% | 1 | 20% | 3 |
| Universe | 40.00 | 2 | 8.89% | 2 | 16.67% | 2 |
| Enterprise | 90.00 | 1 | 7.5% | 3 | 15% | 1 |

Advantages of ROI

Return on investment has the following advantages:

- (a) It relates net income to investments made in a division giving a better measurement of divisional profitability.
- (b) It can be used as a basis for other ratios which are useful for analytical purposes.
- (c) It is easy to understand as it is based on financial accounting measurement.
- (d) It may be used for interfirm comparisons, provided that the firms whose results are being compared are of comparable size and of the same industry.

Disadvantages of ROI

ROI has the following limitations:

- (a) Satisfactory definition of profit and investment are difficult to find. Profit has many concepts such as PBIT, PAIT, controllable profit, profit after deducting all allocated fixed costs. Similarly, the term investment has many meanings- such as gross book value, net book value, historical cost of assets, current cost of assets, assets including or excluding intangible assets.
- (b) While comparing ROI of different segments, it is necessary that segments use similar accounting policies and methods in respect of valuation of stocks, valuation of fixed assets, apportionment of overheads, treatment of research and development expenditure etc.
- (c) ROI may influence a divisional manager to select only investments with high rates of return (i.e. rates which are in line or above his target ROI). Investments which will reduce segments' ROI, but can improve enterprises' value may be rejected. Some segments may invest the available funds in projects which improve segments' ROI at the cost of enterprises overall value.

Residual Income [RI]

Residual Income: [Definition]

***E.I. Kohler* : [Dictionary for Accountants]**

Residual income is “a means of measuring decentralized divisional performance which stresses the profit responsibility and the financial management efficiency of the division managers and typically computed as the difference between divisional profitability and a charge for capital resources committed to the decentralized unit.”

***Christopher Nobes*: [Dictionary of Accounting]**

“Residual income, in the context of calculations inside a complex organization, is the net income of a division after taking account of a notional interest expenses for the resources used by it.”

***C.T. Horngren*:**

As an absolute measure of profitability, residual income is defined as “after-tax operating income less imputed interest. Imputed interest refers to the cost of capital, what the firm must pay to acquire more capital - whether or not it actually has to acquire more capital to take on a project.”

J. Lal:

“Residual income can be defined as the net income of a division, less the imputed capital charge on the assets used by the division. The capital charge is the minimum acceptable rate of return and is calculated by applying this required (or target) rate of return to the division’s investment base. Theoretically, rate of return should be the division’s cost of capital; in most cases, however, it is a cut-off rate based on the firm’s objectives and strategies and will be some what higher than the divisional cost of capital.”

Calculation of RI

RI is calculated as:

$$\text{RI} = \text{Divisional profit} - (\text{Percentage of capital charge} \times \text{Divisional Investment})$$

Example # 3

The following information relates to budgeted operation of Division × of a manufacturing company:

| | |
|-------------------------------------|-----------------------|
| Sales : (50,000 units @ Tk.8 each) | Tk.400,000 |
| Less Variable costs @ Tk.6 per unit | 300,000 |
| Contribution Margin: | <hr/> 100,000 |
| Less Fixed costs | 75,000 |
| Divisional Profit: | <hr/> <hr/> Tk.25,000 |

The amount of divisional investment is Tk.1,50,000 and minimum desired rate of return on the investment is the cost of capital of 20%.

Required:

- (i) Calculate divisional expected ROI
- (ii) Calculate divisional expected RI
- (iii) Comment on the results of (i) and (ii)
- (iv) The divisional manager has the opportunity to sell 10,000 units at 7.50 per unit. Variable cost per unit would be the same as budgeted, but fixed cost would increase by Tk.5,000. Additional investment is Tk.20,000 would also be required. If the manager accepts the special order, by how much and in what direct would his residual income change?

Solution:

$$(i) \text{ ROI} = \frac{\text{Divisional profit}}{\text{Divisional Investment}} \times 100 = \frac{\text{Tk.25,000}}{\text{Tk.25,000}} \times 100 = 16.67\%$$

$$(ii) \text{ RI} = \text{Divisional Profit} - (\text{Percent of cost of capital} \times \text{Divisional Investment})$$

$$= \text{Tk.25,000} - (.20 \times \text{Tk.150,000}) = (\text{Tk.5000})$$

(iii) Divisional performance is not encouraging. ROI is lower than the required rate of return. On the other hand the residual income is also negative.

(iv) Effect of the new opportunity on profitability:

| | Existing Taka | New opportunity Taka | Total Taka |
|--------------------------------|------------------|----------------------------|---------------|
| Sales | 400,000 | 75,000 | 4,75,000 |
| Less Variable Cost @ Tk.6/unit | 300,000 | 60,000 | 3,60,000 |
| Contribution | 100,000 | 15,000 | 1,15,000 |
| Less Fixed Costs: | 75,000 | 5,000 | 80,000 |
| Divisional Profit | 25,000 | 10,000 | 35,000 |
| Less cost of Capital | 30,000 | 4,000 | 34,000 |
| Residual Income | (5,000) | 6,000 | 1,000 |
| ROI | 16.67% | 50% | 20.59% |

The target residual income increases from Tk.(5000) to Tk.1000. At the same time, the ROI will also improve from 16.67% to 20.59%.

Example # 4

The manager of a division that produces electronic audio-products is considering the opportunity to invest in two independent projects. The first is portable MP3 player. The second is a voice recorder designed as a module for the visor or palm PDAs. Without the investments, the division will have average assets for the coming year of Tk.180 lac and expected operating income of Tk.27 lac. The expected operating incomes and the outlay required for each investment are as follows:

| | MP3 | Voice Recorder |
|------------------|------------|----------------|
| Operating Income | Tk.116,000 | Tk.105,000 |
| Outlay | 800,000 | 750,000 |

Corporate headquarters has made available up to Tk.20 lac of capital for this division. Any funds not invested by the division will be retained by headquarters and invested to earn the company's minimum required rate,

12 percent.

Required:

- (i) Compute the ROI for each investment.
- (ii) Compute the divisional ROI for each of the following alternatives:
 - (a) The MP3 player is added.
 - (b) The voice recorder is added.
 - (c) Both investments are added.
 - (d) Neither investment is made; the status quo is maintained.

Assume that divisional managers are evaluated and rewarded on the basis of ROI performance, which alternative do you think the divisional manager will choose?

- (iii) Compute the residual income for each of the alternatives.
- (ii) Compute the residual income for each of the following four alternatives:
 - (a) The MP3 player is added
 - (b) The voice recorder is added.
 - (c) Both investments are added.
 - (d) Neither investment is made; the status quo is maintained.

Assuming that divisional managers are evaluated and rewarded on the basis of residual income, which alternative do you think the divisional manager will choose?

- (v) Based on the answer in requirement (iv) compute the profit or loss from the divisional managers investment decision. Was the correct decision made?

Solution:

(i) Computation of ROI :
$$\frac{\text{Net Operating Income}}{\text{Investments}}$$

| | MP3 | Voice Recorder |
|-------------------|-------------|----------------|
| Operating Income: | Tk. 116,000 | Tk. 105,000 |
| Investment | 800,000 | 750,000 |
| ROI | 14.5% | 14% |

- (ii) (a) The MP3 player is added:

Divisional ROI :
$$\frac{\text{Existing Operating Income} + \text{Incremental Operating Income}}{\text{Existing Investment} + \text{Incremental Investment}}$$

$$= \frac{\text{Tk.}2700,000 + \text{Tk.}116,000}{\text{Tk.}180,00,000 + 800,000} = \frac{\text{Tk.}28,16,000}{188,00,000} = 0.149787$$

$$= 14.98\%$$

(b) The voice recorder is added.

$$= \frac{\text{Tk.}2700,000 + \text{Tk.}105,000}{\text{Tk.}180,00,000 + 750,000} = \frac{\text{Tk.}28,05,000}{187,50,000}$$

$$= 0.1496 = 14.96\%$$

(c) Both investments are added

$$\text{Divisional ROI} = \frac{\text{Tk.}2700,000 + \text{Tk.}1,16,000 + \text{Tk.}1,05,000}{\text{Tk.}180,00,000 + \text{Tk.}800,000 + \text{Tk.}750,000}$$

$$= \frac{2921,000}{195,50,000}$$

$$= 0.1494117 = 14.94\%$$

(d) Neither investment is made.

$$\text{Divisional ROI} = \frac{\text{Tk.}2700,000}{\text{Tk.}180,00,000} = .15 = 15\%$$

When the basis of divisional performance is divisional ROI, the divisional manager in this case will not go for accepting any of the proposals, because acceptance of any of the proposal will reduce divisional ROI.

(iii) Calculation of Residual Income : Divisional Operating Income – (Required rate of return × Investment)

| | MP3 | Voice Recorder |
|-------------------------------|-------------|----------------|
| Operating Income: | Tk. 116,000 | Tk. 105,000 |
| Required Rate of Return | 12% | 12% |
| Investment | 800,000 | 750,000 |
| Required Return on investment | Tk. 96,000 | Tk. 90,000 |
| Residual Income: | Tk. 20,000 | Tk. 15,000 |

(iv)

| Particulars | Investment | Required Rate of Return | Required Return | Operating Income | Residual Income |
|-----------------------------|----------------|-------------------------|-----------------|------------------|-----------------|
| (a) MP3 player is added | Tk. 188,00,000 | 12% | Tk. 22,56,000 | Tk. 28,16,000 | Tk. 560,000 |
| (b) Voice recorder is added | 187,50,000 | 12% | 22,50,000 | 28,05,000 | 555,000 |

| | | | | | |
|-------------------------|------------|-----|-----------|-----------|------------|
| (c) Both are added | 195,50,000 | 12% | 23,46,000 | 29,21,000 | Tk.575,000 |
| (d) Neither is accepted | 180,00,000 | 12% | 21,60,000 | 27,00,000 | 540,000 |

When RI is the basis of evaluation and reward, the division must accept both the opportunities.

(v) In requirement (iv) it is shown that to maximize personal benefits, the divisional manager will reject both the investment opportunities. This will result in sub optimization of enterprise profitability.

If the divisional manager accepts the decision under (iii), the organization will lose by Tk.35,000 (Tk.575,00 – Tk.5,40,000).

Advantages of RI Measures

Residual Income measure has the following advantages:

- (i) It avoids suboptimal decisions as investments are not rejected merely because they lower the divisional manager's ROI.
- (ii) It maximizes growth of the company and increases stockholders' wealth by accepting opportunities which earn a rate of return in excess of the cost of capital.
- (iii) The cost of capital charge on divisional investments ensures that divisional managers are aware of the opportunity cost of funds.
- (iv) Charging each division with the company's cost of capital ensures that decisions taken by different divisions are compatible with the interests of the organization as a whole.

Weaknesses of RI Measures

Weaknesses of RI measure are stated below:

- (i) Like ROI, it is difficult to have satisfactory definition of, 'divisional profit' and 'divisional investment.'
- (ii) It may be difficult to calculate an accurate cost of capital. Also decision has to be taken whether to use company's cost of capital or divisions cost of capital. The former enhances divisional goal congruence and the latter reflects each division's level of risk.
- (iii) Identifying controllable and uncontrollable factors at divisional level may be difficult.

Lesson-3: Economic Value-Added (EVA) and Balanced Scorecard (BSC)

Return on Investment (ROI) and Residual Income (RI) have been criticized over years as measures of divisional performance. To overcome the criticisms, suggestions came from various consulting firms and academics to make some adjustments to the traditional measure like Residual Income and also to develop an new measure by combining both financial and non-financial measures.

After completing this lesson, you are expected to be able to:

- To describe the newly suggested measure i. e. the Economic Value Added (EVA)
- To identify the difference between RI and EVA, and
- To explain BSC as a measure composed of both financial and non-financial measures.

EVA & BSC

Economic Value Added (EVA)

The limitations and dysfunctional actions associated with ROI to evaluate the performance of a division manager have been known and discussed over decades. To overcome the limitations of the ratio measures (ROI), managers preferred an absolute measure i. e. residual income (RI).

Residual (RI) Income = Divisional Operating Income – (Risk adjusted cost of capital of the division x Divisional Investment)

To implement the residual income approach, corporate managers must specify an additional parameter i. e. the risk-adjusted cost of capital of the division. Thus a capital charge is calculated by multiplying the “risk-adjusted cost of capital” by divisions’ net investment. Thus capital charge is deducted from before-tax net income of the division to find out the amount of residual income as given in the equation above. This “residual income” may be termed as the economist’s measure of income. The residual income approach has the superiority over the ROI. Still it is observed in the U.S.A. that the RI is not exclusively used by companies. In a situation like this Stern Steward & Co. developed a slightly different measure of residual income and marketed the measure as Economic Value Added (EVA). Economic value added, like residual income, charges an investment centre or division for the cost of their investment in long term assets and working capital. Economics value is generated only if after-tax operating income exceeds the cost of investing the capital.

The equation for EVA:

EVA = after tax operating income- (weighted average cost of capital x total capital employed)

Required Rate of Return:
It is the minimum rate of return determined after taking into account- real rate of return, expected inflation and risk.

| Particulars Measures | Cost | | Investment base | |
|----------------------------|---|---|------------------------|---|
| | Definition | Example | Definition | Example |
| Residual Income (RI) | Required rate of Return. Minimum rate of Return | Risk-adjusted cost of capital of the division | Operating Assets | Assets under construction, Research and development cost, Employee training cost will not be included |
| Economic Value Added (EVA) | Weighted Average Cost of Capital | Proportion of after-tax cost of debt and portion of cost of equity. | Total Capital Employed | Building, Land, Machinery, Research and Development, Employee Training Cost should be included |

Comparison of Income under RI and EVA Calculation

| | |
|----------------------------|--|
| Residual Income (RI) | * Operating Income = Gross Profit - Operating Expenses Horngren's Approach: After-tax operating income |
| Economic Value Added [EVA] | * After tax operating income Horngren's Approach: Adjusted after tax operating Income |

Example # 1

Suppose that Furman, Inc. had after-tax operating income last year of Tk. 15,83,000. Three sources of financing were used by the company:

| | |
|----------------------|--------------------|
| 8% Mortgage Bonds : | Tk. 20 lac |
| 10% Unsecured Bonds: | 30 lac |
| Common Stock | 100 lac |
| Total : | <u>Tk. 150 lac</u> |

Marginal tax rate of the company is 40%. The cost of common stock should be calculated on the basis of a return on long-term security of 6% plus a premium of 6%. Calculate the amount of EVA of the company.

Solution:

Weighted Average Cost of Capital

| | Amounts | Weight | After-tax Cost | Weighted cost |
|-----------------|---------------|--------|----------------|---------------|
| Mortgage Bonds | Tk. 20,00,000 | .133 | 4.8% | 0.64 |
| Unsecured Bonds | 30,00,000 | .200 | 6.0% | 1.20 |
| Common Stock | 100,00,000 | .667 | 12.00% | 8.00 |
| Total | 1,50,00,000 | 1.000 | | 9.84% |

Cost of Capital : Tk. 150,00,000 x .0984 = Tk. 14,76,000

EVA = After-tax Operating Income – Weighted Average Cost of Capital
= Tk. 15,83,000 – Tk. 14,76,000 = Tk. 1,07,000

Definition of Investment Capital

Possible definitions of investment capital are:

- (i) Total Assets
- (ii) Total Assets employed i. e. assets under construction are not included
- (iii) Total Assets minus current liabilities
- (iv) Stockholders equity

Example # 2

The ABC Company uses economic value added (EVA) to evaluate top management performance. In 2008, ABC had net operating income of Tk.3,691 million, income taxes of Tk.1,222 million and average non-current liabilities plus stockholders equity of Tk.11,640 million. The company's capital is about 30% long-term debt and 70% equity. Assume that the after-tax cost of debt is 5% and the cost of equity is 12%.

Required:

- (i) Compute ABC's economic value added (EVA). Assume definitions after-tax operating income and invested capital as reported in ABC's annual reports without adjustments advocated by Stern Stewarts or others.
- (ii) Explain what EVA tells you about the performance of the top management of ABC in 2000.

Solution:

Weighted Average cost of Capital: $.3 \times 5\% + .7 \times 12\% = 9.9\%$

Capital charge of the year: 9.9% of Tk.11,640 million = Tk.1152.36 million

EVA : After-tax operating – Weighted average cost of capital x Adjusted average investment.

$$= \{(\text{Tk.}3,691\text{m} - 1,222\text{m}) - \text{Tk.}1152.36\text{m}\}$$

$$= \text{Tk.}1316.64 \text{ million}$$

Suggested Adjustments:

EVA = Adjusted after-tax operating income-cost invested capital (%) x Adjusted average invested capital

The formula for calculating EVA given above shows that two components of EVA calculation i. e. operating income and average investment capital are to be adjusted. Stern and Stewart, the proponent of EVA has identified more than 100 different adjustments. Some of the adjustments suggested by Stern and Stewart convert “after-tax operating income into a closer approximation of cash income and invested capital into a closer approximation of the cash invested in economic resources the company uses to create value.” Some of the suggested adjustments are:

- (i) Use taxes paid rather than tax expenses.
- (ii) Capitalize research and development expenses.
- (iii) Use FIFO for inventory valuation.
- (iv) Add unrecorded goodwill and accumulated goodwill amortization to capital and add back goodwill amortization to after-tax operating income and
- (v) If a company deducts any interest expense in computing

operating income, it must add this (after-tax) interest expense to its after-tax operating income.

- (vi) Capitalize expenditures on customer development advertising and promotion if these expenditure will benefit future years.
- (vii) Capitalize expenditure on employee training that will benefit future years.
- (viii) Market price-level adjustments to assets, revenues and expenses are stated in current year currency value.
- (ix) Use gross book values or restated net book values to reflect the assets actual economic value.

Reason for popularity of EVA

During late 1980s, several consulting firms published studies that showed “a high correlation between the changes in companies’ residual income and changes in their stock market valuation. These correlations were significantly higher than correlations between changes in ROI and stock market price changes. The income toward the RI measure received even greater publicity when it was renamed into a far more accessible and acceptable term-Economic value added – by the Stern Steward consulting organization, a prime advocate for the Economic value added concept.”

Summary of Divisional Performance Measures

| Measures | Cost centre | Revenue centre | Profit centre | Investment centre |
|---------------------------|-------------|----------------|---------------|-------------------|
| Cost variance | √ | √ | √ | √ |
| Revenue variance analysis | - | √ | √ | √ |
| Contribution margin | - | - | √ | √ |
| ROI | - | - | - | √ |
| Flexible Budgeting | √ | √ | √ | √ |
| Standard Costing | √ | - | √ | √ |
| Profit Budgeting | - | - | √ | √ |
| Net Profit Margin | - | - | √ | √ |
| Asset Turnover | - | - | - | √ |
| EVA | - | - | - | √ |

Balanced Score Card (BSC)

Concept

A problem with assessing performance with financial measures like contribution margin, profit, ROI, RI, is that financial measures are backward looking. That is, they focus on past financial performance rather than on what managers are doing to create future shareholder value. An approach that addresses this limitation is the Balance Scorecard, a technique developed by Robert Kaplan, a Harvard Professor, and David Norton, a consultant.

Kaplan and Norton comment on balanced scorecard (BSC) as follows:

“The Balanced Score-card (BSC) provides managers with the instrumentation they need to navigate to future competitive success. Today, organizations are competing in complex environments so that an accurate understanding of their goals and the methods for attaining those goals is vital. The Balanced Scorecard translates an organization’s mission and strategy into a comprehensive set of performance measures that provides the framework for a strategic measurement and management system. The balanced scorecard retains an emphasis on achieving financial objectives, but also include the performance drivers of these financial objectives. The scorecard measures organizational performance across four balanced perspectives: financial, customers, internal business processes and learning and growth. The BSC enables companies to track financial results while simultaneously monitoring progress in building the capabilities and acquiring the intangible assets they need for future growth.”

Meaning of Balance in Balanced Scorecard

According to Atkinson, Banker, Kaplan and Mark Young, to be balanced, performance measurement systems must meet two requirements:

- (i) They should reflect the organization’s understanding of causes of successful performance on the organization’s primary objectives—that is, the performance measurement system should monitor both the organization’s performance and what management believes are the drivers of performance on the organization’s primary objectives. This is the depth requirement of being balanced.
- (ii) The performance measurement system should measure the most critical aspects or differentiators of organization performance. These aspects give the organization its unique abilities to achieve its primary objective. This is the breadth requirement of being balanced.

The focus of the balanced scorecard is a system of performance measurements that organizations use to track performance on its primary and secondary objectives. In this sense, the organization’s planning and strategy, which defines what relationship the organization must develop with its employees, its suppliers and the community to be successful with its targeted customers, defines the focus and scope of the balanced scorecard.

Factors in Balanced Scorecard

The Balanced Scorecard is a set of performance targets and results relating to four dimensions of performance—financial, customer, internal process and innovation. The balanced scorecard is a management method that focuses attention on achieving organizational objectives. It recognizes that organizations are responsible to different stakeholder groups, such as

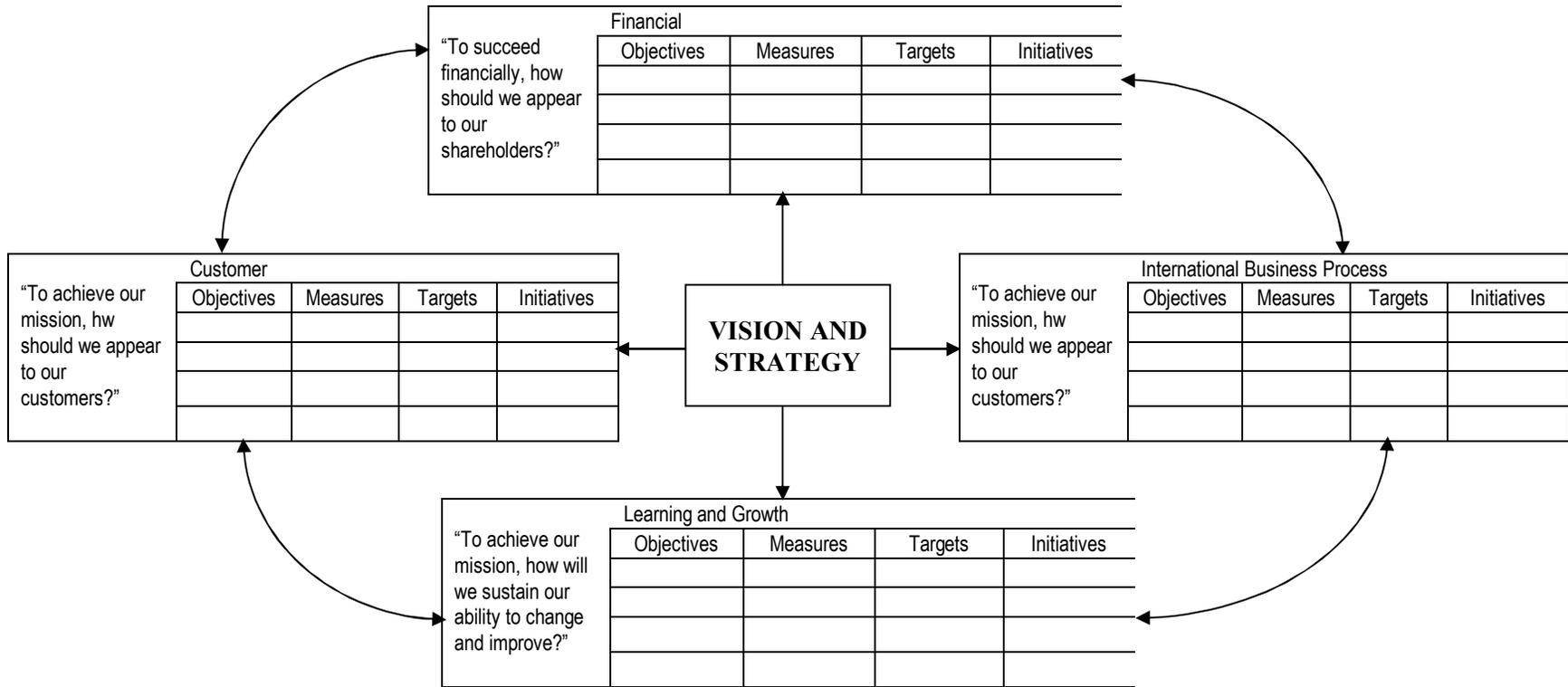
Balanced scorecard is a set of performance targets and results relating to four dimensions of performance—financial, customer, internal process and innovation.

employees, suppliers, customers, community and stakeholders. The balanced scorecard shows an organization's performance in meeting its objectives relating to stakeholders. Sometimes different stakeholders have different wants. For example, employees depend on an organization for their employment. Shareholders depend on an organization to maintain their investment. The organization must balance those competing wants. Hence, the concept of a balanced scorecard is to measure how well the organization is doing in view of competing stakeholders wants.

An example of a balanced scorecard appear in fig 1. As one can see, it balances the efforts of organization among the financial, customer, process and learning and growth. A company using a balanced scorecard will develop three to five performance measures for each of four dimensions and the measures are tied to the company's strategy for success. Some potential measures for each dimension are illustrated in figure-2

Hensen and Mowen have referred to balanced scorecard as 'strategic-based responsibility accounting system' which translates the mission and strategy of an organization into operational objectives and measures for four different perspectives: the financial perspective, the customer perspective, the process perspective and the infrastructure (learning and growth) perspective.

A more descriptive balanced scorecard is displayed in figure-3.



Source: R.S. Kaplan and D.P. Norton, "Using the Balanced Scorecard as a Strategic Management System," Harvard Business Review, Jan-Feb, 1996.
Figure-1: Balanced Score Card

Four Perspectives of a Balanced Scorecard

| Measures | | |
|--------------------|---|--|
| Financial | Is the company achieving its financial goals? | Operating income Return on assets Sales growth Cash flow from operations Reduction of administrative expense |
| Customer | Is the company meeting customer expectations? | Customer satisfaction Customer retention New customer acquisition Market share On time delivery Time to fill orders. |
| Internal Processes | Is the company improving critical internal processes? | Defect rate Lead time Number of suppliers Material turnover Percent of practical capacity. |
| Innovation | Is the company improving its ability to innovate? | Amount spent on employee training Employee satisfaction Employee retention Number of new products New product sales as a percent of total sales Number of patents |

Fig. 2. Some Examples of Measures for the Four Perspectives of a Balanced Scorecard.

Balanced Scorecard Example

Strategy: To be the leading organization in our industry through constant innovation and adaptation in our environment. We will measure success in terms of value creation for our shareholders and customers, by the learning and growth of our employees, and by our good corporate citizenship.

| Objectives | Initiatives | Performance Measure | Target |
|--|-----------------------------|-------------------------------------|--------|
| Financial Perspective Increase share-holder wealth Provide growth | Develop new products | Return on assets | 25% |
| | Increase online sales | Percentage growth in sales | 30% |
| Customer Perspective Increase market share Increase customer satisfaction | Increase advertising | Percentage market share | 10% |
| | Increase post sales service | Percentage satisfied through survey | 99% |

| Objectives | Initiatives | Performance Measure | Target |
|--|-----------------------------------|--|---------|
| Internal Business Process Perspective | | | |
| Reduce throughput time | Reduce non-value added activities | Average throughput time | 4 hours |
| Provide on-time delivery | Streamline delivery process | Percentage on-time Delivery | 90% |
| Reduce defects | Develop employee quality teams | Percentage Defects | 0.01% |
| Learning and Growth Perspective | | | |
| Develop a multi- skilled workforce | Provide employee training | percentage of employees with multiple skills | 80% |
| Improve information systems | Hire new employees in computing | Number of employees in computing | 20 |
| Reduce employee turnover | Pay higher salaries | Percentage annual turnover | 10% |

Fig. 3: Balanced Scorecard Example.

Source: Cheryl. S. Mcwatters, Dale C. Morse and Jerold L. Zimmerman, Management Accounting, McGraw Hill Irwin, 2001. 442.

| Groups | Performance measures | Formula for Calculation | Desired change |
|--|---|-------------------------|----------------|
| Customer Perspectives | Customers satisfaction as measures by survey | | + |
| | Number of customer complaints | | - |
| | Market share | | + |
| | Product returns as a percentage of sales | | - |
| | Percentage of customers retained from test period | | + |
| | Number of new customers | | + |
| Learning Growth Perspective | Suggestions per employee | | + |
| | Value-added per employee | | + |
| | Employee turnover | | - |
| | Hours of in-house training per employee | | + |
| Internal Business Processing Perspective | Percentage of sales from new produces | | + |
| | Time to introduce new products to market | | - |
| | Percentage of customer calls answered within 20 seconds | | + |
| | On-time deliveries as a percentage of all deliveries | | + |
| | Work-in-process inventory as percentage of sales | | - |
| | Unfavorable standard cost variance | | - |
| | Defect-free units a percentage of completed units | | + |

| Groups | Performance measures | Formula for Calculation | Desired change |
|--------|---|---|----------------|
| | Delivery time | Order receiving & shipping | - |
| | Throughout time | Manufacturing cycle time | - |
| | Manufacturing cycle efficiency | MCE = $\frac{\text{Value-added time}}{\text{Throughout time}}$ | + |
| | Quality cost | Total of preventive cost, appraisal cost, internal failure cost and external failure cost | - |
| | Setup time | | - |
| | Time from all by customer to repair of product | | - |
| | Percent of customer complaints settled on first contact | | + |
| | Time of settle a customer claim | | - |

Characteristics of good Balanced Scorecards

Balanced scorecards to be effective and useful should have the following characteristics:

1. Balanced scorecards should highlight a company's strategy by focusing on cause-and-effect relationship. Assume, Uni Lever Ltd. aims to be a low-cost manufacturer and accelerate growth. The balanced scorecards should pinpoint objectives and measures in 'learning and growth perspective', which could improve internal business processes. These, in turn, would result into greater customer satisfaction, larger market share, higher operating income and shareholder wealth.
2. Balanced scorecards should help in communicating the strategy formulated to all members of an organization by translating the strategy into a coherent and linked set of understandable and measurable operational targets. Subsequently, managers and employees take actions, based on scorecard, to achieve the firm's strategy. To facilities decisions and actions in accordance with scorecards, it is preferable to develop scorecards at the division and department levels.
3. In profit-seeking companies, the balanced scorecard gives a strong emphasis on financial objectives and measures. Sometimes managers give too much importance to innovation, quality and customer satisfaction though they may not produce tangible benefits. A good balanced scorecard considers nonfinancial measures as a part of strategy or programmer to achieve and improve future financial performance. When financial and non-financial performance measures are properly linked in balance scorecards, many non-

financial measures serve as leading indicators of future financial performance.

4. The balanced scorecard limits the number of measures used by identifying only the most critical ones. Avoiding a proliferation of measures focuses management's attention on those that are key to the implementation of strategy.
5. The scorecard highlights suboptimal tradeoffs that managers may make when they fail to consider operational and financial measures together. For example, a company for which innovation is key, could achieve superior short-run financial performance by reducing spending on R & D. A good balanced scorecard would signal that the short-run financial performance may have been achieved by taking actions that hurt future financial performance because a leading indicator of that performance, R & D spending and R & D output, has declined.

Source: Charles T. Horngren, George Foster, Sri Kant M. Datar, Cost Accounting, A Managerial Emphasis, Prentice Hall, 2000, 467-468

Self-Assessment Questions (SAQs)

(A) True - False

1. Indicate the true statement by using “T” and the false statement by using “F”:
 - (a) Responsibility accounting is one of the important tools of management control.
 - (b) Management control is a pragmatic concern for results through people.
 - (c) The period of accounting control is always greater than the period of management control.
 - (d) The source discipline of accounting control is economics.
 - (e) Persons primarily involved in task control are management.
 - (f) Control (performance) reports should contain both significant and insignificant information.
 - (g) A profit centre manager has the authority over costs, revenue, profit and also investment.
 - (h) Credit policy and inventory policy are also within the control of an investment centre manager.
 - (i) As a performance measure, ROI is better than RI.
 - (j) EVA means economic value assessment.
 - (k) Cash balance is also included in operating assets.
 - (l) $ROI = (Sales \div Total\ Assets) \times (Net\ Profit \div Sales)$
 - (m) Other things remaining the same an increase in selling price will improve ROI.
 - (n) Stern Stewart was the proponent of EVA.
 - (o) In measuring EVA, research and development expenses are charged against profit instead of capitalizing.

(B) Multiple Choice Questions

2. Select the correct answer for the following multiple choice questions:
 - (a) When a manager of a division is given the responsibility for or authority to make decisions that affect costs and revenues but no responsibility for investments, the division is termed as:
 - (i) A Cost Centre;
 - (ii) A Profit Centre;
 - (iii) An Investment Centre;
 - (iv) Revenue centre;
 - (v) None of the above.

- (b) The term used to describe the excess of a division's gross profit over direct divisional expenses is:
 - (i) Income from operation;
 - (ii) Net Income;
 - (iii) Segment Margin;
 - (iv) Net Operating Income;
 - (v) None of the above.
- (c) What is the most appropriate base to use in computing a rate of return for a business segment?
 - (i) Current assets of the segment
 - (ii) Current assets minus current liabilities.
 - (iii) Total segment assets minus allocated liabilities.
 - (iv) Total segment assets employed.
 - (v) None of the above.
- (d) A company's ROI would generally increase other things remaining the same when
 - (i) Assets increase;
 - (ii) Costs increase;
 - (iii) Selling prices increase;
 - (iv) Cost increase;
 - (v) None of the above.
- (e) ROI can be calculated by multiplying margin by.
 - (i) Asset turnover;
 - (ii) Net sales;
 - (iii) Net income;
 - (iv) Average total assets;
 - (v) Inventory Turnover.
- (f) Division A of a company has ROI of 30% and an investment turnover of 3. What is the margin?
 - (i) 10%; (ii) 100%; (iii) 30%; (iv) None of the above.
- (g) The segment margin of an investment centre minus the imputed interest on the assets used by the investment centre is known as -
 - (i) Return on investment;
 - (ii) Residual income;
 - (iii) Operating Income;
 - (iv) Return on assets;
 - (v) Return on assets committed.
- (h) Residual income is a performance evaluation that is used in conjunction with or instead of, return on investment (ROI). In many cases, residual income is preferred to ROI because

- (i) Residual income is a measure over time, while ROI represents the results for one period.
 - (ii) Residual income concentrates on maximizing absolute income rather than a percentage return as with ROI.
 - (iii) The imputed interest rate used in calculating residual income is more easily derived than the target rate that is compared to the calculated ROI.
 - (iv) Average investment is employed with residual income while year-end investment is employed with ROI.
- (i) Residual income is a better measure for performance evaluation of an investment centre manager than return on investment because-
- (i) The problems associated with measuring the asset base are eliminated.
 - (ii) Desirable investment decisions will not be neglected by high-return divisions.
 - (iii) Only gross book value of assets needs to be calculated.
 - (iv) The arguments about the implicit cost of interest are eliminated.
- (j) Digital Tech uses an accounting system that charge costs to the manager who has the authority to make decisions incurring the costs. For example, if a sales manager authorizes a rush order than results in additional manufacturing costs, then these additional costs are charged to the sales manager. This type of accounting system is known as:
- (i) Responsibility Accounting;
 - (ii) Functional Accounting;
 - (iii) Contribution Accounting;
 - (iv) Transfer-price Accounting;
 - (v) Programme Budgeting.

(C) Descriptive Questions

- (a) Decentralization has benefits and costs'. Name three of these.
- (b) What kinds of organizations find decentralization to be preferable to centralization?
- (c) Define economic value added (EVA) and describe three ways a company can improve its EVA.
- (d) What is decentralization? Discuss the differences between centralized and decentralized decision making.

- (e) Explain why firms choose to decentralize.
- (f) What are three benefits and two disadvantages of ROI?
- (g) What is RI? Explain how residual income overcomes one of ROI's disadvantage.
- (j) What is EVA? How does it differ from ROI and RI?

Practical Problems:

1. M. Associates is a consulting firm that specializes in information systems for construction and landscaping companies. The firm has two offices - one in Dhaka and one in Chittagong. The firm classifies the direct costs of consulting jobs as variable costs. A segmented income statement for the company's most recent year is given below:

| | Total Company | | Segment | | | |
|---|---------------|--------|------------|------|------------|------|
| | | | Dhaka | | Chittagong | |
| Sales | Tk.750,000 | 100.0% | Tk.150,000 | 100% | Tk.600,000 | 100% |
| Less variable expenses | 405,000 | 54.0% | 45,000 | 30% | 360,000 | 60% |
| Contribution Margin: | Tk.3,45,000 | 46.0% | 105,000 | 70% | 240,000 | 40% |
| Less Traceable fixed expen. | 1,68,000 | 22.4% | 78,000 | 52% | 90,000 | 15% |
| Office segment margin | 1,77,000 | 23.6% | Tk.27,000 | 18% | Tk.150,000 | 25% |
| Less Common fixed expenses not traceable to segments | 120,000 | 16.0% | | | | |
| Net Operating Income | Tk.57,000 | 7.6% | | | | |

Required:

- (i) By how much would the company's net operating income increase if Chittagong increased its sales by Tk.75,000 per year? Assume no change in cost behavior.
 - (ii) Assume that sales in Dhaka increase by Tk.50,000 next year and that sales in Chittagong remain unchanged. Assume no change in fixed costs.
 - (a) Prepare segmented income statement for the company using the format above.
 - (b) Observe from the income statement you have prepared that the CM ratio for at 70% (the same as in the data above) but that the segment margin ratio has changed. How do you explain the change in the segment margin ratio?
2. B. Company, a wholesale distributor of DVDs. has been experiencing losses for some time, as shown by its most recent monthly income statement below:

| | |
|------------------------|--------------|
| Sales | Tk.15,00,000 |
| Less Variable expenses | 5,88,000 |
| Contribution margin | 9,12,000 |
| Less fixed expenses | 9,45,000 |

Net Operating Income (loss) Tk.(33,000)

In an effort to isolate the problem, the president has asked for an income statement segmented by geographic market. Accordingly, the Accounting Department has developed the following data:

| | Geographic Market | | |
|--|-------------------|------------|------------|
| | South | Central | North |
| Sales | Tk.400,000 | Tk.600,000 | Tk.500,000 |
| Variable expenses as percentage of sales | 52% | 30% | 40% |
| Traceable fixed expenses | Tk.240,000 | Tk.330,000 | Tk.200,000 |

Required:

- (i) Prepare an income statement segmented by geographic market, as desired by the president.
 - (ii) The company's sales manager believes that sales in the central geographic market could be increased by 15% if the advertising were increased by Tk.25,000 each month. Would you recommend the increased advertising?
3. As management accountant for a group of four similar companies you have recently introduced an interim comparison scheme. A summary of basic information received from each company for the period under review is as follows: (Tk. in '000)

| Companies: | A | B | C | D |
|---------------------|--------|------|------|------|
| | Tk. | Tk. | Tk. | Tk. |
| Net Current Assets | : 520 | 385 | 525 | 315 |
| Fixed Assets | : 930 | 715 | 975 | 585 |
| Sales | : 2470 | 1980 | 2925 | 1665 |
| Production Cost | : 1605 | 1228 | 1784 | 1016 |
| Selling Cost | : 370 | 317 | 497 | 187 |
| Administrative Cost | : 74 | 226 | 329 | 187 |
| Operating Profit | : 221 | 209 | 315 | 162 |

Required:

- (a) Present the information to management in such a way as to compare clearly the results achieved by each company with those of the rest of the group.
 - (b) Write a short constructive report to the directors of company A, setting out the possible reasons for the differences in their results as compared with the rest of the group.
4. A group of companies is divided into ten operating divisions, each of which is autonomous. The cost of capital for the group is 12% per annum and it is currently 15% on its capital employed. In the

ROI calculation, return is equated with net profit and capital employed is the figure at the beginning of the financial year. All fixed assets are depreciated on a straight line basis. Investments in new projects include incremental working capital. Projects sold or withdrawn from operating are treated as consisting of fixed assets only.

If no new capital expenditure transactions take place the position of four of the divisions would be:

| Divisions | Capital employed as at | Budgeted for 2008 | |
|-----------|----------------------------|------------------------|-------------------|
| | 1 January 2008 (Tk.000) | Net Profit (Tk.000) | Sales (Tk.000) |
| P | 320 | 80 | 800 |
| Q | 450 | 150 | 1400 |
| R | 280 | 84 | 700 |
| S | 200 | 26 | 200 |

The following transactions are proposed:

Division P : Investment Tk.100,000 to yield sales of Tk.150,000 per annum and net profit of Tk.20,000 per annum.

Division Q : Sales for Tk.75,000 of a project that is budgeted to yield a net profit of Tk.15,000 in 2008. The original equipment cost Tk.600,000 seven years ago with an expected life of eight years.

Division R : (i) Sale of product line at book value. The original equipment cost Tk.60,000 two years ago with an expected life of three years. This line is budgeted to yield a net profit of Tk.20,000 in 2008, combined with (ii) replacement of (i) above by investing Tk.100,000 in a new product to yield Tk.30,000 per annum.

Division S : Investment of Tk.80,000 in a project to yield sales of Tk.36,000 per annum and a net profit of Tk.11,200 per annum.

Note : In each of the above transactions, you are to assume that the sale and/or investment would be completed by 1 January 2008 so as to be included in the relevant ROI calculations for the year 19x0. Ignore taxations and inflation and assume that actual results are as budgeted.

Required:

- (a) On the assumption that each transaction goes ahead:
 - (i) Calculate the new ROI for each division for the year ending 31st December, 2008.

- (ii) Identify those divisional managers whose bonuses will be higher if they receive annual bonuses related to the level of their respective ROI.
 - (iii) State in respect of each division whether the group's interests will be favourably or adversely affected by the proposed transactions. Explain briefly why in each case.
- (b) Identify, with brief reasons, which proposals the group will approve if new capital expenditure were limited to Tk.200,000 for the four divisions.
- (c) (i) Compare the old results of division P and division S, both of which are in the same type of business, and briefly advise the divisional manager of division S how he might improve his performance based on the data concerning division P.
- (ii) Comment briefly on how the new project for division S fits in with the advice given in C (i) above.
- (d) Calculate the lowest price at which the equipment should be sold by division Q if the transaction proposed is to break even financially for the group.
- (e) (i) Explain briefly the concept of 'residual income' in the context of performance evaluation.
- (ii) Calculate the residual income for each division for 2008 on the assumption that each transaction goes ahead.
5. A company has two divisions, X and Y and evaluates its managers on the ROI criterion. Budgeted for the next year are as follows:

| | X (Tk.) | Y (Tk.) | Total (Tk.) |
|--------------------|-----------------|-----------------|-----------------|
| Investment | 1200,000 | 10,00,000 | 22,00,000 |
| Revenue | 600,000 | 3,00,000 | 9,00,000 |
| Operating Expenses | (300,000) | (2,00,000) | (5,00,000) |
| Profit | <u>3,00,000</u> | <u>1,00,000</u> | <u>4,00,000</u> |

A new investment opportunity has arisen and could be adopted by either division. It requires an investment of Tk.200,000 and promises annual operating profits of Tk.40,000.

Required:

- (i) Which division (X or Y) would accept the new project? Why?
- (ii) If an RI criterion with minimum ROI of 18% were in use, which division (X or Y) would accept the new project? Why?
- (iii) With minimum ROI of 18% should the new project be adopted from the view point of the company? Why?

6. The following information relates to the operating of three divisions of a company for 2008.

| | Division A | Division B | Division C |
|---|------------|------------|------------|
| | Tk. | Tk. | Tk. |
| Divisional Contribution to Central Corporate Expenses | 5,00,000 | 500,000 | 500,000 |
| Divisional Investment | 40,00,000 | 50,00,000 | 60,00,000 |
| Divisional Sales | 240,00,000 | 200,00,000 | 160,00,000 |
| Divisional Employees | 22,500 | 12,000 | 10,500 |

The company evaluates divisional performance using rate of return on investment (ROI) after allocating a portion of the central corporate expenses to each division. Central corporate expenses for 2005 were Tk.900,000.

- Compute the ROI of each division before allocation of central corporate expenses.
 - Compute the ROI of each division assuming central corporate expenses are allocated based on divisional investment.
 - Repeat (b) assuming that central corporate expenses are allocated based on divisional sales.
7. The manager of a division that produces add-on products for the automobile industry has just been presented the opportunity to invest in two independent projects. The first is an air-conditioner for the back sets of vans and minivans. The second is a turbocharger. Without the investments, the division will have average assets for the coming year of Tk.2,56,00,000 and expected operating income of Tk.35,84,000. The outlay required for each investment and the expected operating incomes are as follows:

| | Air Conditioner | Turbocharger |
|------------------|-----------------|--------------|
| Outlay | Tk.7,50,000 | Tk.5,40,000 |
| Operating income | 67,500 | 54,000 |

Corporate headquarters will borrow up to Tk.13,00,000 to add on division for further investments. The amount borrowed will be through unsecured bonds at a rate of 9 percent. The marginal tax rate is 35 percent.

Required:

- Compute the ROI for each investment project.
- Compute the budgeted divisional ROI for each of the following four alternatives:

- (a) The air conditioner investment is made.
- (b) The turbocharger investment is made.
- (c) Both investments are made.
- (d) Neither additional investment is made.

Assume that divisional managers are evaluated and rewarded on the basis of ROI performance, which alternative do you think the division manager will choose?

(iii) Suppose that the borrowing must be for the entire Tk.13,00,000. Calculate the EVA of the two investments taken as a package. Based on EVA are investments profitable?

8. The Angel Company has several divisions. Of these, three divisions (Globe, Universe, and Enterprise) all are in mature industries. Data for these divisions appear below (in crores of Tk.)

| | Division | | |
|-----------------------------------|----------|----------|------------|
| | Globe | Universe | Enterprise |
| Sales | Tk.320 | Tk.450 | Tk.1,200 |
| Income | 32 | 40 | 90 |
| Investment | 160 | 240 | 600 |
| Depreciation (included in income) | 20 | 30 | 80 |

Current assets and liabilities remain fairly constant from year to year. Angel Company requires a minimum ROI of 10 percent.

Required:

- (i) Rank the divisions in order of their contribution to the firm, using at least three different criteria.
 - (ii) Choose the one ranking criterion that you believe to be the best and justify your choice.
 - (iii) If these divisions had been in the growth stage, would your response to part (ii) have changed? How and why?
9. Nike, Inc. is the largest seller of athletic footwear and athletic apparel in the world. Its financial results for the 2007 and 2008 fiscal years included (in lakh).

| | 2008 | 2007 |
|--------------------|---------|----------|
| Revenue | Tk.8995 | Tk.8,777 |
| Operating expenses | 8,010 | 7,920 |
| Interest expenses | 45 | 44 |
| Income taxes | 340 | 295 |

Average invested capital (total assets less current liabilities) 3,759 3,748

- (i) Suppose that Nike’s cost of capital is 12.5%. Compute the company’s economic value added for 2007 and 2008. Assume definitions of after-tax operating income and invested capital as reported in Nike’s annual reports without adjustments advocated by Stern Stewart or other.
- (ii) Discuss the change in EVA between 2007 and 2008.

10. X Corporation is a market of air-cooled gasoline engines for outdoor power equipment. The company’s engines are used by the lawn and garden equipment industry. According to the company’s 2008 Annual report “management subscribe to the premise that the value of X Corporation is enhanced if the capital invested in the company’s operations yields a cash return that is greater than that expected by the provider of capital.”

The following data are from X Corporation 2008 Annual Report (Tk. in lac):

| | <u>2008</u> | <u>2007</u> |
|---------------------------------------|-------------|-------------|
| Adjusted before tax operating profit: | Tk.187,994 | Tk.131,546 |
| Cash taxes | 65,255 | 41,102 |
| Adjusted average invested capital | 697,887 | 716,112 |
| Cost of capital | 10.3% | 10.0% |

Required:

- (a) Compute the economic value added for X Corporation for 2007 and 2008.
- (b) Did X Corporation overall performance improve from 2007 & 2008? Explain.

11. Finding unknowns:

Consider the following data:

| Particulars | Divisions | | |
|---------------------------------|------------|--------------|------------------|
| | J | K | L |
| Income | Tk.140,000 | Tk. ? | Tk. ? |
| Revenue | Tk. ? | Tk. ? | Tk. ? |
| Invested Capital | Tk. ? | Tk.30,00,000 | Tk.1,60,00,000 ? |
| Income percentage of revenue | 7% | 4% | ?% |
| Capital Turnover | 4 | ? | 3 |
| Rate of Return on Investment | ?% | 20% | 15% |
| Inputted interest on investment | 20% | 12% | ?% |

| | | | |
|-----------------|-------|-------|-------------|
| Residual Income | Tk. ? | Tk. ? | Tk.4,80,000 |
|-----------------|-------|-------|-------------|

(a) Fill in the blanks (b) Which division is the best performer?

12. Match each of the following performance measures to one or more of the four perspectives of the balanced scorecard. Note that a performance measure can relate to more than one perspective.

| Performance Measures | Balanced Scorecard Perspective |
|---|--|
| Employee productivity | Organizational learning and growth |
| Employee satisfaction | Business and production process efficiency |
| Return on assets | Customer Value |
| Customer satisfaction | Financial Performance |
| Employee Turnover | |
| On-time delivery performance from supplies | |
| Percent of customers who are repeat customers | |
| On-time delivery performance to customer | |
| Product quality | |

13. Match each of the following performance measures to one or more of the four perspectives of the balanced scorecard. Note that a performance measure can relate to more than one perspective.

| | |
|------------------------------|---|
| Customer Satisfaction | Anticipation of customer needs |
| Acquisition of new customers | Product quality |
| On-time deliveries | Process efficiency |
| Customer retention | Employee satisfaction |
| Customer profitability | Employee skills |
| Product innovations | Complain with environmental regulations |
| Market share | Suppliers reliability quality |
| Overall profitability | |

14. Listed below are common performance measures appearing on balance scorecards. Indicate whether the listed measure is primarily associated with the financial, customer, internal processes, or learning and growth perspective.

- Product development cycle time
- Retention of target customers

- Net Cash flow
- Employee turnover rate
- Market share
- Revenue growth in segments
- Days sales in inventory
- Training hours
- Material handling cost per unit
- Return on sales
- Occupational injuries and illness
- Average cost per invoice

15. Exeter Corporation has recently begun a continuous improvement campaign. As a consequence, there have been many changes in operating procedures. Progress has been slow, particularly in trying to develop new performance measures for the factory.

Management has been gathering the following data over the past four months:

| Performance Measures | Month | | | |
|--|-------|------|------|------|
| | 1 | 2 | 3 | 4 |
| Quality Control Measures: | | | | |
| Customers complaints as a percentage of units sold | 1.4% | 1.3% | 1.1% | 1.0% |
| Warranty claims as a percentage of units sold | 2.3% | 2.1% | 2.0% | 1.8% |
| Defects as a percentage of units produced | 4.6% | 4.2% | 3.7% | 3.4% |
| Material Control Measures: | | | | |
| Scrap as a percentage of material cost | 3.2% | 2.9% | 3.0% | 2.7% |
| Machine Performance Measures: | | | | |
| Percentage of machine availability | 80% | 82% | 81% | 79% |
| Use as a percentage of availability | 75% | 73% | 71% | 70% |
| Average set up time (Hours) | 2.7 | 2.5 | 2.5 | 2.6 |
| Delivery Performance Measures: | | | | |
| Throughput time or velocity | ? | ? | ? | ? |
| Manufacturing cycle efficiency | ? | ? | ? | ? |
| Delivery cycle time | ? | ? | ? | ? |
| Percentage of on-time deliveries | 84% | 87% | 91% | 95% |

16. The president has attended conferences at which importance of throughput time, manufacturing cycle efficiency and delivery cycle time were stressed, but no one at the company is sure how they are computed. The data to compute these measures have been gathered and appear below:

| | Month | | | |
|---|-------|------|------|-----|
| | 1 | 2 | 3 | 4 |
| Wait time per order before start of production, in days | 16.7 | 15.2 | 12.3 | 9.6 |
| Inspection time per unit, in days | 0.1 | 0.3 | 0.6 | 0.8 |
| Process time per unit, in days | 0.6 | 0.5 | 0.6 | 0.6 |

| | | | | |
|------------------------------|-----|-----|-----|-----|
| Queue time per unit, in days | 5.6 | 5.7 | 5.6 | 5.7 |
| Move time per unit, in days | 1.4 | 1.3 | 1.3 | 1.4 |

As part of its continuous improvement program, the company is planning to move toward a JIT purchasing and production system.

Required:

1. For each month, compute the following operating performance measures:
 - a. The throughput time or velocity of production
 - b. The manufacturing cycle efficiency (MCE)
 - c. The delivery cycle time.
2. Using the performance measures given in the problem and those you computed in (1) above, do the following
 - a. Identify the areas where the company seems to be improving;
 - b. Identify the areas where the company seems to be deteriorating or stagnating,
 - c. Explain why you think some specific areas are improving while others are not.