

**Course Code:** ACT4050-8

**Course Start Date:** 08/11/2014

**Section:** Standard Costs, Performance Evaluation, Analysis and Capital Investment

**Week:** 5

**Activity:** Analyze Capital Investments in a Global Business Setting

**Activity Due Date:** 09/14/2014

### Activity Description

To discuss capital investments properly, you must think globally. Investments strategies today must take into account the global market place. Investment, accounting and banking decisions in one part of the globe impact other businesses around the world. The following problems will help you evaluate capital investment proposals using the average rate of return, cash payback, net present value, and internal rate of return methods; use a single and multiple factory overhead rate for product costing; use activity-based costing for product costing, Just-In-Time manufacturing practices on cost accounting, and performance measurement.

Complete the following Problems:

Chapter 10: 10-1A, 10-3A, 10-4A

Chapter 11: 11-1A, 11-3A, 11-4A

Chapter 12: 12-1A, 12-2A, 12-3A

In addition to the problem documentation, prepare a 2-3 page summary in which you analyze your results. Support your paper with minimum of one (1) scholarly resource. In addition to these specified resources, other appropriate scholarly resources, including older articles, may be included.

Length: 3-5 pages not including title and reference pages

Your paper should demonstrate thoughtful consideration of the ideas and concepts presented in the course and provide new thoughts and insights relating directly to this topic. Your response should reflect scholarly writing and current APA standards where appropriate. Be sure to adhere to Northcentral University's Academic Integrity Policy.

Upload your assignment using the Upload Assignment button below.

### Learning Outcomes

- 4.0 Analyze cost information to support operating decisions and process improvements.
- 5.0 Generate cost information to support strategic decisions regarding products, customers, technology, and divisions.

### Resources

Books	
Reference	Instruction
Warren, C. S., Reeve, J. M., & Duchac, J. (2012) Managerial accounting.	Read Chapters 10, 11 and 12

Articles	
Reference	Instruction
Ghan, H., Yin, S., & Chan, F. S. (2010). Implementing just-in-time philosophy to reverse logistics systems: A review. <a href="http://proxy1.ncu.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&amp;db=bth&amp;AN=53564687&amp;site=eds-live">http://proxy1.ncu.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&amp;db=bth&amp;AN=53564687&amp;site=eds-live</a>	Read article

OBJ. 3, 4

✓ Net present value,  
Processing Mill,  
\$71,700



**EX 10-21 Net present value—unequal lives**

Gold Creek Mining Company has two competing proposals: a processing mill and an electric shovel. Both pieces of equipment have an initial investment of \$840,000. The net cash flows estimated for the two proposals are as follows:

Year	Net Cash Flow	
	Processing Mill	Electric Shovel
1	\$280,000	\$350,000
2	250,000	325,000
3	250,000	300,000
4	200,000	300,000
5	150,000	
6	125,000	
7	100,000	
8	100,000	

The estimated residual value of the processing mill at the end of Year 4 is \$350,000.

Determine which equipment should be favored, comparing the net present values of the two proposals and assuming a minimum rate of return of 15%. Use the present value tables presented in this chapter (Exhibits 1 and 2).

OBJ. 3, 4

**EX 10-22 Net present value—unequal lives**

Al a Mode, Inc., is considering one of two investment options. Option 1 is a \$60,000 investment in new blending equipment that is expected to produce equal annual cash flows of \$16,000 for each of seven years. Option 2 is a \$70,000 investment in a new computer system that is expected to produce equal annual cash flows of \$20,000 for each of five years. The residual value of the blending equipment at the end of the fifth year is estimated to be \$10,000. The computer system has no expected residual value at the end of the fifth year.

For purposes of analysis, assume that the blending equipment is adjusted to a five-year life and assume there is sufficient capital to fund only one of these projects. Determine which project should be selected, comparing the (a) net present values and (b) present value indices of the two projects, assuming a minimum rate of return of 10%. Round the present value index to two decimal places. Use the present value tables presented in this chapter (Exhibits 1 and 2).

**Problems Series A**

OBJ. 2, 3

✓ 1. a. 22.5%



**PR 10-1A Average rate of return method, net present value method, and analysis**

The capital investment committee of Hampton Landscaping Company is considering two capital investments. The estimated income from operations and net cash flows from each investment are as follows:

Year	Greenhouse		Skid Loader	
	Income from Operations	Net Cash Flow	Income from Operations	Net Cash Flow
1	\$22,200	\$ 35,000	\$ 7,200	\$ 20,000
2	12,200	25,000	7,200	20,000
3	7,200	20,000	7,200	20,000
4	(2,800)	10,000	7,200	20,000
5	(2,800)	10,000	7,200	20,000
	<u>\$36,000</u>	<u>\$100,000</u>	<u>\$36,000</u>	<u>\$100,000</u>

Each project requires an investment of \$64,000. Straight-line depreciation will be used, and no residual value is expected. The committee has selected a rate of 12% for purposes of the net present value analysis.

**Instructions**

1. Compute the following:
  - a. The average rate of return for each investment. Round to one decimal place.
  - b. The net present value for each investment. Use the present value of \$1 table appearing in this chapter (Exhibit 1).
2. ~~Prepare~~ Prepare a brief report for the capital investment committee, advising it on the relative merits of the two investments.

OBJ. 2, 3

✓ 1. b. Plant Expansion, \$47,490



**PR 10-2A Cash payback period, net present value method, and analysis**

Runway Apparel Inc. is considering two investment projects. The estimated net cash flows from each project are as follows:

Year	Plant Expansion	Retail Store Expansion
1	\$ 350,000	\$ 360,000
2	350,000	340,000
3	140,000	140,000
4	90,000	100,000
5	70,000	60,000
Total	<u>\$1,000,000</u>	<u>\$1,000,000</u>

Each project requires an investment of \$700,000. A rate of 15% has been selected for the net present value analysis.

**Instructions**

1. Compute the following for each product:
  - a. Cash payback period.
  - b. The net present value. Use the present value of \$1 table appearing in this chapter (Exhibit 1).
2. ~~Prepare~~ Prepare a brief report advising management on the relative merits of each project.

OBJ. 3

✓ 2. Railcars, 1.12



**PR 10-3A Net present value method, present value index, and analysis**

Mid-Continent Railroad Company wishes to evaluate three capital investment proposals by using the net present value method. Relevant data related to the proposals are summarized as follows:

	New Maintenance Yard	Route Expansion	Acquire Railcars
Amount to be invested	\$12,000,000	\$20,000,000	\$36,000,000
Annual net cash flows:			
Year 1 .....	6,000,000	12,000,000	22,000,000
Year 2 .....	4,800,000	11,000,000	18,500,000
Year 3 .....	4,500,000	9,500,000	16,000,000

**Instructions**

1. Assuming that the desired rate of return is 20%, prepare a net present value analysis for each proposal. Use the present value of \$1 table appearing in this chapter (Exhibit 1).
2. Determine a present value index for each proposal. Round to two decimal places.
3. ~~Which~~ Which proposal offers the largest amount of present value per dollar of investment? Explain.

OBJ. 3

✓ 1. a. Generating unit, \$109,150

**PR 10-4A Net present value method, internal rate of return method, and analysis**

The management of Pacific Utilities Inc. is considering two capital investment projects. The estimated net cash flows from each project are as follows:

Year	Generating Unit	Distribution Network Expansion
1	\$370,000	\$280,000
2	370,000	280,000
3	370,000	280,000
4	370,000	280,000

The generating unit requires an investment of \$1,172,900, while the distribution network expansion requires an investment of \$850,360. No residual value is expected from either project.

#### Instructions

- Compute the following for each project:
  - The net present value. Use a rate of 6% and the present value of an annuity of \$1 table appearing in this chapter (Exhibit 2).
  - A present value index. Round to two decimal places.
- Determine the internal rate of return for each project by (a) computing a present value factor for an annuity of \$1 and (b) using the present value of an annuity of \$1 table appearing in this chapter (Exhibit 2).
- What advantage does the internal rate of return method have over the net present value method in comparing projects?

OBJ. 3, 4

✓ 1. Servers, \$27,770



#### PR 10-5A Evaluate alternative capital investment decisions

The investment committee of Shield Insurance Co. is evaluating two projects, office expansion and upgrade to computer servers. The projects have different useful lives, but each requires an investment of \$610,000. The estimated net cash flows from each project are as follows:

Year	Net Cash Flows	
	Office Expansion	Servers
1	\$160,000	\$210,000
2	160,000	210,000
3	160,000	210,000
4	160,000	210,000
5	160,000	
6	160,000	

The committee has selected a rate of 12% for purposes of net present value analysis. It also estimates that the residual value at the end of each project's useful life is \$0, but at the end of the fourth year, the office expansion's residual value would be \$200,000.

#### Instructions

- For each project, compute the net present value. Use the present value of an annuity of \$1 table appearing in this chapter (Exhibit 2). (Ignore the unequal lives of the projects.)
- For each project, compute the net present value, assuming that the office expansion is adjusted to a four-year life for purposes of analysis. Use the present value of \$1 table appearing in this chapter (Exhibit 1).
- Prepare a report to the investment committee, providing your advice on the relative merits of the two projects.

OBJ. 2, 3, 5

✓ 5. Proposal B, 1.26



#### PR 10-6A Capital rationing decision involving four proposals

Renaissance Capital Group is considering allocating a limited amount of capital investment funds among four proposals. The amount of proposed investment, estimated income from operations, and net cash flow for each proposal are as follows:

# Problems Series A

OBJ. 2

✓ 1. b. \$60 per machine hour

## PR 11-1A Single plantwide factory overhead rate

California Chrome Company manufactures three chrome-plated products—automobile bumpers, valve covers, and wheels. These products are manufactured in two production departments (Stamping and Plating). The factory overhead for California Chrome is \$338,400.

The three products consume both machine hours and direct labor hours in the two production departments as follows:

	Direct Labor Hours	Machine Hours
<b>Stamping Department</b>		
Automobile bumpers	700	940
Valve covers	380	680
Wheels	420	720
	<u>1,500</u>	<u>2,340</u>
<b>Plating Department</b>		
Automobile bumpers	200	1,460
Valve covers	210	890
Wheels	205	950
	<u>615</u>	<u>3,300</u>
<b>Total</b>	<u><u>2,115</u></u>	<u><u>5,640</u></u>

### Instructions

- Determine the single plantwide factory overhead rate, using each of the following allocation bases: (a) direct labor hours and (b) machine hours.
- Determine the product factory overhead costs, using (a) the direct labor hour plantwide factory overhead rate and (b) the machine hour plantwide factory overhead rate.

OBJ. 3

✓ 2. Wheels, \$96,000

## PR 11-2A Multiple production department factor overhead rates

The management of California Chrome Company, described in Problem 11-1A, now plans to use the multiple production department factory overhead rate method. The total factory overhead associated with each department is as follows:

Stamping Department	\$180,000
Plating Department	158,400
<b>Total</b>	<u><u>\$338,400</u></u>

### Instructions

- Determine the multiple production department factory overhead rates, using direct labor hours for the Stamping Department and machine hours for the Plating Department.
- Determine the product factory overhead costs, using the multiple production department rates in (1).

OBJ. 3, 4

✓ 4. Snowboards, \$236,000 and \$59

## PR 11-3A Activity-based and department rate product costing and product cost distortions

White Mountain Sports Inc. manufactures two products: snowboards and skis. The factory overhead incurred is as follows:

Indirect labor	\$200,000
Cutting Department	85,000
Finishing Department	95,000
<b>Total</b>	<u><u>\$380,000</u></u>



The activity base associated with the two production departments is direct labor hours. The indirect labor can be assigned to two different activities as follows:

Activity	Budgeted Activity Cost	Activity Base
Production control	\$ 80,000	Number of production runs
Materials handling	120,000	Number of moves
Total	<u>\$200,000</u>	

The activity-base usage quantities and units produced for the two products are shown below.

	Number of Production Runs	Number of Moves	Direct Labor Hours—Cutting	Direct Labor Hours—Finishing	Units Produced
Snowboards	340	4,000	3,500	1,500	4,000
Skis	<u>60</u>	<u>2,000</u>	<u>1,500</u>	<u>3,500</u>	<u>4,000</u>
Total	<u>400</u>	<u>6,000</u>	<u>5,000</u>	<u>5,000</u>	<u>8,000</u>

#### Instructions

- Determine the factory overhead rates under the multiple production department rate method. Assume that indirect labor is associated with the production departments, so that the total factory overhead is \$175,000 and \$205,000 for the Cutting and Finishing departments, respectively.
- Determine the total and per-unit factory overhead costs allocated to each product, using the multiple production department overhead rates in (1).
- Determine the activity rates, assuming that the indirect labor is associated with activities rather than with the production departments.
- Determine the total and per-unit cost assigned to each product under activity-based costing.
- Explain the difference in the per-unit overhead allocated to each product under the multiple production department factory overhead rate and activity-based costing methods.

#### OBJ. 4

✓ 2. Newsprint  
total activity cost,  
\$243,900



#### PR 11-4A Activity-based product costing

Alabama Paper Company manufactures three products (computer paper, newsprint, and specialty paper) in a continuous production process. Senior management has asked the controller to conduct an activity-based costing study. The controller identified the amount of factory overhead required by the critical activities of the organization as follows:

Activity	Activity Cost Pool
Production	\$437,400
Setup	176,000
Moving	31,200
Shipping	105,300
Product engineering	<u>127,500</u>
Total	<u>\$877,400</u>

The activity bases identified for each activity are as follows:

Activity	Activity Base
Production	Machine hours
Setup	Number of setups
Moving	Number of moves
Shipping	Number of customer orders
Product engineering	Number of test runs

The activity-base usage quantities and units produced for the three products were determined from corporate records and are as follows:

	Machine Hours	Number of Setups	Number of Moves	Number of Customer Orders	Number of Test Runs	Units
Computer paper	900	120	270	440	80	1,000
Newsprint	1,080	50	110	140	25	1,200
Specialty paper	450	270	400	590	150	500
Total	<u>2,430</u>	<u>440</u>	<u>780</u>	<u>1,170</u>	<u>255</u>	<u>2,700</u>

Each product requires 0.9 machine hour per unit.

**Instructions**

1. Determine the activity rate for each activity.
2. Determine the total and per-unit activity cost for all three products.
3. Why aren't the activity unit costs equal across all three products since they require the same machine time per unit?

OBJ. 5

✓ 3. Hope Hospital loss from operations, (\$4,150)



**PR 11-5A Allocating selling and administrative expenses using activity-based costing**

Western Mechanical Inc. manufactures cooling units for commercial buildings. The price and cost of goods sold for each unit are as follows:

Price	\$55,200 per unit
Cost of goods sold	<u>27,500</u>
Gross profit	<u>\$27,700 per unit</u>

In addition, the company incurs selling and administrative expenses of \$199,800. The company wishes to assign these costs to its three major customers, Coastal Atlantic University, Celebrity Arena, and Hope Hospital. These expenses are related to three major nonmanufacturing activities: customer service, project bidding, and engineering support. The engineering support is in the form of engineering changes that are placed by the customer to change the design of a product. The budgeted activity costs and activity bases associated with these activities are:

Activity	Budgeted Activity Cost	Activity Base
Customer service	\$ 74,000	Number of service requests
Project bidding	48,800	Number of bids
Engineering support	77,000	Number of customer design changes
Total costs	<u>\$199,800</u>	

Activity-base usage and unit volume information for the three customers is as follows:

	Coastal Atlantic University	Celebrity Arena	Hope Hospital	Total
Number of service requests	40	35	125	200
Number of bids	25	12	24	61
Number of customer design changes	30	20	90	140
Unit volume	15	10	4	29

**Instructions**

1. Determine the activity rates for each of the three nonmanufacturing activity pools.
2. Determine the activity costs allocated to the three customers, using the activity rates in (1).

(Continued)

An activity analysis indicated the following activity costs with this process.

Preparing materials request	\$ 25,600
Requesting, receiving, and selecting vendor bids	80,000
Preparing purchase order	16,400
Preparing receiving ticket	22,400
Matching M/R, R/T, and invoice	32,000
Correcting reconciliation differences	72,000
Preparing and delivering vendor payment	32,000
Total process activity cost	<u>\$320,000</u>

On average, the process handles 25,000 individual requests for materials that result in 25,000 individual payments to vendors.

Management proposes to improve this process in two ways. First, the Purchasing Department will develop a preapproved vendor list for which orders can be placed without a request for quote. It is expected that this will reduce the cost of requesting and receiving vendor bids by 70%. Second, additional training and standardization will be provided to reduce errors introduced into the materials requisition form and receiving tickets. It is expected that this will reduce the number of reconciliation differences from 50% to 15% over an average of 25,000 payments.

- Develop a table showing the percent of individual activity cost to the total process cost.
- Determine the average total process cost per vendor payment, assuming 25,000 payments.
- Prepare a table showing the improvements in the activity costs as a result of the changes proposed by management.
- Estimate the average cost per vendor payment, assuming that the changes proposed by management are enacted for 25,000 total payments. Round to the nearest cent.

## Problems Series A

OBJ. 1

### PR 12-1A Just-in-time principles

Glow Bright Co. manufactures light bulbs. Glow Bright's purchasing policy requires that the purchasing agents place each quarter's purchasing requirements out for bid. This is because the Purchasing Department is evaluated solely by its ability to get the lowest purchase prices. The lowest cost bidder receives the order for the next quarter (90 working days).

To make its bulb products, Glow Bright requires 54,000 pounds of glass per quarter. Glow Bright received two glass bids for the third quarter, as follows:

- Mid-States Glass Company*: \$25.00 per pound of glass. Delivery schedule: 54,000 (600 lbs. × 90 days) pounds at the beginning of July to last for 3 months.
- Akron Glass Company*: \$25.15 per pound of glass. Delivery schedule: 600 pounds per working day (90 days in the quarter).

Glow Bright accepted Mid-States Glass Company's bid because it was the low-cost bid.

### Instructions

- ~~\_\_\_\_\_~~ Comment on Glow Bright's purchasing policy.
- ~~\_\_\_\_\_~~ What are the additional (hidden) costs, beyond price, of Mid-States Glass Company's bid? Why weren't these costs considered?
- Considering just inventory financing costs, what is the additional cost per pound of Mid-States Glass Company's bid if the cost of money is 10%? (*Hint*: Determine the average value of glass inventory held for the quarter and multiply by the quarterly interest charge, then divide by the number of pounds.)

## OBJ. 1

- ✓ 1. Total wait time,  
3,190 minutes



## PR 12-2A Lead time

Audio Max Electronics Company manufactures electronic stereo equipment. The manufacturing process includes printed circuit (PC) card assembly, final assembly, testing, and shipping. In the PC card assembly operation, a number of individuals are responsible for assembling electronic components into printed circuit boards. Each operator is responsible for soldering components according to a given set of instructions. Operators work on batches of 80 printed circuit boards. Each board requires 5 minutes of assembly time. After each batch is completed, the operator moves the assembled cards to the final assembly area. This move takes 10 minutes to complete.

The final assembly for each stereo unit requires 20 minutes and is also done in batches of 80 units. A batch of 80 stereos is moved into the test building, which is across the street. The move takes 20 minutes. Before conducting the test, the test equipment must be set up for the particular stereo model. The test setup requires 30 minutes. The units wait while the setup is performed. In the final test, the 80-unit batch is tested one at a time. Each test requires 7 minutes. The completed batch, after all testing, is sent to shipping for packaging and final shipment to customers. A complete batch of 80 units is sent from final assembly to shipping. The Shipping Department is located next to final assembly. Thus, there is no move time between these two operations. Packaging and labeling requires 8 minutes per unit.

## Instructions

- Determine the amount of value-added and non-value-added lead time and the value-added ratio in this process for an average stereo unit in a batch of 80 units. Round percentages to one decimal place. Categorize the non-value-added time into wait and move time.
- How could this process be improved so as to reduce the amount of waste in the process?

## OBJ. 3

- ✓ 4. Raw and In  
Process Inventory,  
\$57,550



## PR 12-3A Just-in-time accounting

Optic Matrix Inc. manufactures and assembles automobile instrument panels for both Yokohama Motors and Detroit Motors. The process consists of a just-in-time product cell for each customer's instrument assembly. The data that follow concern only the Yokohama just-in-time cell.

For the year, Optic Matrix Inc. budgeted the following costs for the Yokohama production cell:

Conversion Cost Categories	Budget
Labor	\$615,000
Supplies	96,000
Utilities	25,000
Total	<u>\$736,000</u>

Optic Matrix Inc. plans 3,200 hours of production for the Yokohama cell for the year. The materials cost is \$125 per instrument assembly. Each assembly requires 24 minutes of cell assembly time. There was no November 1 inventory for either Raw and In Process Inventory or Finished Goods Inventory.

The following summary events took place in the Yokohama cell during November:

- Electronic parts and wiring were purchased to produce 8,200 instrument assemblies in November.
- Conversion costs were applied for the production of 8,000 units in November.
- 7,850 units were started, completed, and transferred to finished goods in November.
- 7,750 units were shipped to customers at a price of \$400 per unit.

## Instructions

- Determine the budgeted cell conversion cost per hour.
- Determine the budgeted cell conversion cost per unit.
- Journalize the summary transactions (a) through (d).
- Determine the ending balance in Raw and In Process Inventory and Finished Goods Inventory.
- How does the accounting in a JIT environment differ from traditional accounting?