

## Net present value concept and profitable index

Capital investments earn returns over a long period of time. When considering the capital investments we must look at the time value of money. The time value of money involves discontinuing cash flows. Under the next present value method, the present value of a project cash inflows is compared to the present value of these cash flows, called the net present value determines whether or not the project is an acceptable investment. To illustrate this method see below.

The ELM Company would like to buy a new machine for its operations. The new machine will cost one hundred five thousand dollars. The manufacturer estimates that the machine would be usable for twelve years but would require the replacement of several key parts at the end of the sixth year. These parts would cost nine thousand dollars including the installation. After twelve years the machine could be sold for seven thousand five hundred dollars.

The company estimates the cost to operate the machine will be seven thousand five hundred dollars per a year. The present method of dipping chocolates costs thirty thousand dollars per a year. In addition to reducing cost, the new machine will increase production by six thousand boxes of chocolate per a year. The company realizes a contribution margin of one dollar and fifty cents per a box. A twenty percent rate of return is required on all investments.

We must first find the annual net cash inflows that will be provided by the new dipping machine.

Reduction in annual operating cost:

Operating cost, present hand method	\$30,000
Operating cost, new machine	<u>\$7,000</u>
Annual savings in cost	\$23,000

Increased annual contribution margin:

6000 boxes x \$1.50	\$9000
Total annual net cash inflows	\$32,000

Then using the total annual net cash inflow of thirty two thousand dollars we compute the net present value using a twenty percent rate of return and the present value of a dollar and present value of annuity tables.

Item	Year(s)	Amount of cash flows	20% factor	Present value of cashflows	
Cost of machine	now	\$105,000	1.00(1)	\$105,000	
Replacement of parts	6	\$9,000	.335(2)	\$3,015	
Annual net cash inflow	1-12	\$32,000	4.439(3)	\$142,048	
Salvage value of machine	12	\$7,500	0.112(3)	\$840	
Net present value				\$34,813	

Use no table, or use present value of table one, or use present value of annuity table

The net present value is thirty four thousand eight hundred thirteen positive, therefore, it is more cash inflows than cash out flows. We can also compute a profitability index for this investment. The profitability index is used to rank multiple competing investment projects than require different investment amounts the formula to compute the profitability index is below.

$$\text{Project profitability index} = \frac{\text{Net present value of the project}}{\text{Investment required}}$$

Therefore if you complete the following investments net present values

	Investment	
	A (above)	B
Investment required (a)	105,000	120,000
Net present Value (b)	34,813	19,873
(b) 34,813	19,873(b)	
(a) 105,000	120,000(a)	

Profitability index b net present value 34813 divided by investment required, a, 105000 equals 0.33 and net present value b, 19873 divided by investment required a, 120000 equals 0.17

Based on the profitability index shown, investment A is a better investment because its index is greater.