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.

<table>
<thead>
<tr>
<th>Reduction in annual operating cost:</th>
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<tbody>
<tr>
<td>Operating cost, present hand method $30,000</td>
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<tr>
<td>Operating cost, new machine</td>
</tr>
<tr>
<td>Annual savings in cost</td>
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<tr>
<th>Increased annual contribution margin:</th>
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<tbody>
<tr>
<td>6000 boxes x $1.50</td>
</tr>
<tr>
<td>Total annual net cash inflows</td>
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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.
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 profitable 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

<table>
<thead>
<tr>
<th>Investment</th>
<th>A (above)</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investment required (a)</td>
<td>105,000</td>
<td>120,000</td>
</tr>
<tr>
<td>Net present Value (b)</td>
<td>34,813</td>
<td>19,873</td>
</tr>
</tbody>
</table>

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.