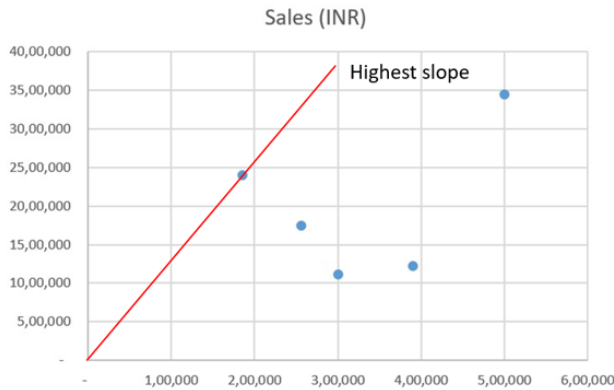


8.2 Efficiency Comparison - Graphical Method

Sunday, 02 October 2022 12:15

Summary	<ul style="list-style-type: none">Efficiency comparison using graphical method																								
	<h2>Graphical method</h2> <p>Efficiency comparison</p>																								
	<h3>When things are simpler...</h3> <ul style="list-style-type: none">When we only have a single input and a single output, a simple ratio of the input to the output is the efficiency.The economic unit with the highest ratio is the most efficient.Other economic units need to either increase the output for the same level of input; or reduce the input to achieve the same level of output.See the data and the graph.....																								
	<h3>Single input, single output</h3> <table><tr><th>Sales office</th><th>Budget (INR)</th><th>Sales (INR)</th><th>Sales per INR invested</th></tr><tr><td>1</td><td>3,00,000</td><td>11,10,000</td><td>3.7</td></tr><tr><td>2</td><td>2,56,000</td><td>17,50,000</td><td>6.8</td></tr><tr><td>3</td><td>5,00,000</td><td>34,50,000</td><td>6.9</td></tr><tr><td>4</td><td>3,90,000</td><td>12,24,000</td><td>3.1</td></tr><tr><td>5</td><td>1,85,000</td><td>24,00,000</td><td>13.0</td></tr></table> <ul style="list-style-type: none">Sales: output variableBudget: input variable$\therefore \text{Efficiency} = \text{Sales per INR invested} = \frac{\text{Output}}{\text{Input}} = \frac{\text{Sales}}{\text{Budget}}$Sales office 5 has the highest efficiency.	Sales office	Budget (INR)	Sales (INR)	Sales per INR invested	1	3,00,000	11,10,000	3.7	2	2,56,000	17,50,000	6.8	3	5,00,000	34,50,000	6.9	4	3,90,000	12,24,000	3.1	5	1,85,000	24,00,000	13.0
Sales office	Budget (INR)	Sales (INR)	Sales per INR invested																						
1	3,00,000	11,10,000	3.7																						
2	2,56,000	17,50,000	6.8																						
3	5,00,000	34,50,000	6.9																						
4	3,90,000	12,24,000	3.1																						
5	1,85,000	24,00,000	13.0																						
<ul style="list-style-type: none">For a single input, single output, how do you decide the most efficient EU on graph?	<h3>Single input, single output</h3>  <ul style="list-style-type: none">Sales: y-axis Budget: x-axisYou plot the points and then for every point you draw a line from origin to that point.																								

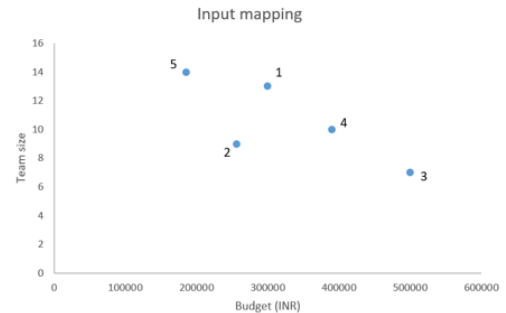
- For a single input, single output, the economic unit with the line with the highest slope is considered to be the most efficient.

- For two inputs and a constant output, how do you decide EUs?
- For inputs the frontiers are drawn on the _____ side.

More inputs/outputs

- For two inputs and an output too, things are not difficult.
- Assume that each of the sales office has the same sales target: INR 10,00,000 (output). They have their budgets approved and the respective team sizes (inputs).

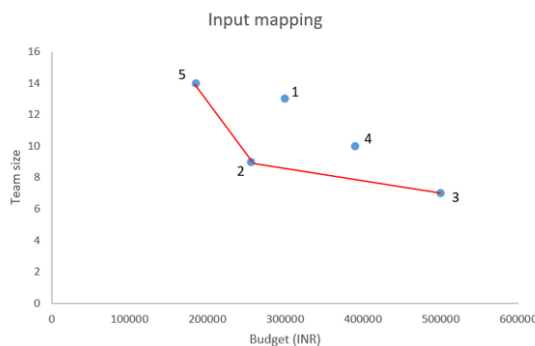
Sales office	Budget (INR)	Team size
1	3,00,000	13
2	2,56,000	9
3	5,00,000	7
4	3,90,000	10
5	1,85,000	14



- In this example we have two inputs: Budget and Team size
- The output (sales target) is same for all the sales offices.
- Here, we're only plotting the inputs.
- The EU's (Economic units) that consume less resources (inputs) are considered efficient.
- 5, 2 and 3 are efficient.

- Observe how the frontier is drawn for the inputs
- _____ the inputs the better.

Two inputs, single output: Efficiency frontier



Sales office	Budget (INR)	Team size
1	3,00,000	13
2	2,56,000	9
3	5,00,000	7
4	3,90,000	10
5	1,85,000	14

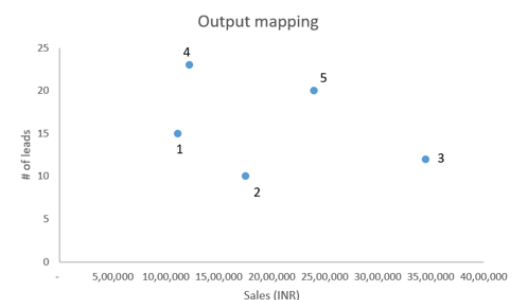
- This is how the efficiency frontier(envelope) would look like.
- For inputs, we draw the frontier on the lower side.
- Lesser the inputs (resources) the better.

- How do you decided EUs for two outputs and a constant input for all?
- For outputs the frontiers are drawn on the _____ side.

One input, two outputs

- Let every sales office be given the same budget (INR 2,00,000). The sales achieved (in INR) and the potential sales leads (potential customers) are the outputs we track.

Sales office	Sales (INR)	No of leads
1	11,10,000	15
2	17,50,000	10
3	34,50,000	12
4	12,24,000	23
5	24,00,000	20



	<ul style="list-style-type: none">• Here, the input (budget) is same for all sales offices.• And we have two outputs: Sales, No. of leads• We're only plotting the outputs here.• Here, 4, 5 and 3 are considered efficient.																		
<ul style="list-style-type: none">• Observe how the frontier is drawn for the outputs.• _____ the outputs the better.	<div>One input, two outputs: Efficiency Frontier</div> <div><p>Output mapping</p><table><caption>Data points from the Output mapping graph</caption><tr><th>Point</th><th>Sales (INR)</th><th># of leads</th></tr><tr><td>1</td><td>10,000,000</td><td>15</td></tr><tr><td>2</td><td>20,000,000</td><td>10</td></tr><tr><td>3</td><td>35,000,000</td><td>12</td></tr><tr><td>4</td><td>12,500,000</td><td>23</td></tr><tr><td>5</td><td>25,000,000</td><td>20</td></tr></table></div> <ul style="list-style-type: none">• For outputs we draw the frontier on the outer side.• More the outputs the better.	Point	Sales (INR)	# of leads	1	10,000,000	15	2	20,000,000	10	3	35,000,000	12	4	12,500,000	23	5	25,000,000	20
Point	Sales (INR)	# of leads																	
1	10,000,000	15																	
2	20,000,000	10																	
3	35,000,000	12																	
4	12,500,000	23																	
5	25,000,000	20																	
	<ul style="list-style-type: none">• We looked at two dimensional examples in this lecture. Same analogy will apply to higher dimensions as well.																		