

# Haldon's New Factory

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# Objective

Haldon's expanding! But where to?

Choosing between:

- Australia
- Bangladesh
- Canada

# How?

This is easy right? Just pick the cheapest!

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Not quite...

# How?

So, pick the most profitable?

# How?

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Still no...

# How?

What else is there!?

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A bunch of things that aren't money:

- Public image
- Environmental impact
- Impact on the local community



# How?

This seems hard. How can we possibly pick?

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Answer:

With decision analysis! (featuring mathematics)

# What is Decision Analysis?

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- Figure out the things we care about
- Decide how much we care about each thing
- Give each country a score for each thing
- Rank the countries
- Then decide!

## The Things We Care About

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- Profit (net)
- Vehicle reliability
- Child labour
- CO2 emissions
- NO2 emissions
- Water usage
- Employment

## How Much We Care About the Things

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"Haldon strives to be the most responsible car manufacturer in the world."

But we're still a company, we need to make money.



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Answer:

We don't. We make an informed guess.

# How Much We Care About the Things

• Profit (net)	100
• Vehicle reliability	55
• Child labour	40
• CO2 emissions	10
• NO2 emissions	24
• Water usage	8
• Employment	20

## Scoring Each Country for Each Thing

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No guesses need to be made here:  
Everything is already in numbers! Just need to normalize.

# Scoring Each Country for Each Thing

	Australia	Bangladesh	Canada
<b>Profit per Year</b>	78	100	83
<b>Reliability</b>	100	69	90
<b>No Child Labour</b>	100	0	100
<b>Min CO2</b>	86	60	100
<b>Min Water Consumption</b>	91	70	100
<b>Min NO2</b>	100	88	97
<b>Maximize Employment</b>	67	100	83

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This is where the featured maths comes into it.

# Rank the Countries

Each thing we care about contributes to the countries final score.

Using an excel spreadsheet we can then add together these contributions!

# Rank the Countries

Objectives			Alternatives		
Name	Wt	Norm Wt	Australia	Bangladesh	Canada
Max Profit per year	100	0.39	78	100	83
Max Reliability	55	0.21	100	69	90
No Child Labour	40	0.16	100	0	100
Min CO2	10	0.04	86	60	100
Min Water consumption	8	0.03	91	70	100
Min NO2	24	0.09	100	88	97
Maximise number of employees	20	0.08	67	100	83
		Total Value:	<b>87.976</b>	<b>74.255</b>	<b>89.559</b>
		Rank:	2nd	3rd	1st

Canada wins!

## Conclusion

# So, Canada?

Are you sure?

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Yes.

# So, Canada?

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Yes.      and no...

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- Things we missed.
- Things we weren't told.
  - “Actually, profit isn't something to be concerned about”
  - “We just really like it here in Australia”

# Not Canada?

We know there is error, but our result is still valid.

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We know there is error, but our result is still valid.

Pick Canada.