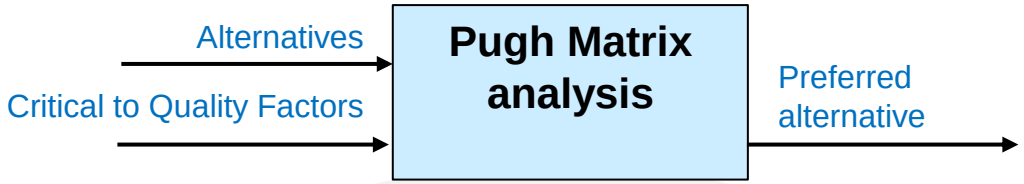
Pugh Matrix

Problem
How to choose among multiple alternatives?

Difficulty
Some training required

- The **Pugh Matrix** is a simple technique for making a decision among multiple alternatives.
- The **Pugh Matrix** uses pairwise comparisons between the alternatives, for each defined criteria or requirement.
- The most time-consuming part of using a **Pugh Matrix** is creating the selection criteria.
  - The assessments are quick and the calculation is easy.

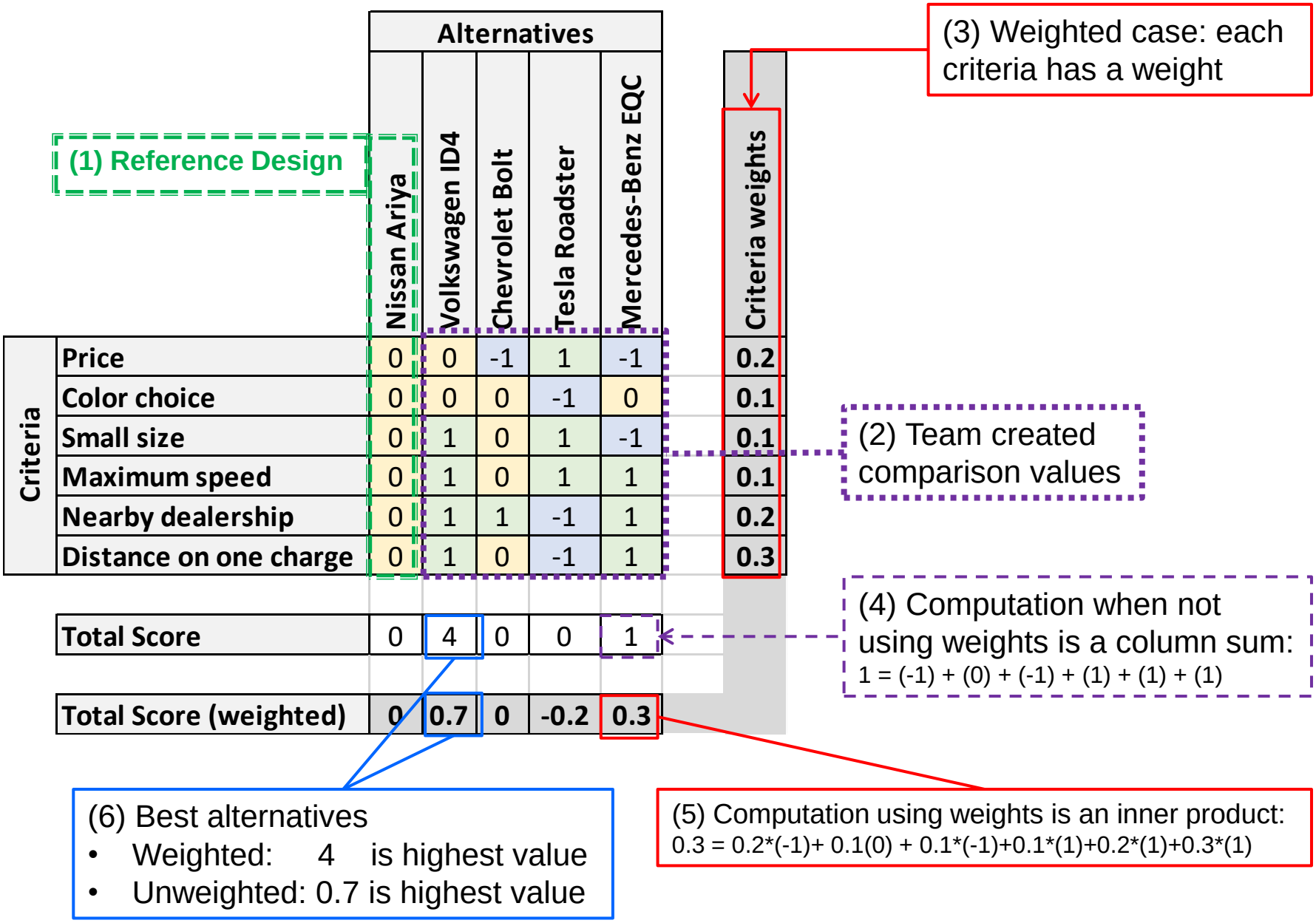


Process

1. Choose the alternatives to be compared
   - List them along the top of the matrix.
2. Define the multiple selection criteria
   - These are the "Critical to Quality" (CTQ) factors.
   - They might come from the Voice of the Customer (VOC).
   - List them along the left side of the matrix.
   - Optionally, define weights for each CTQ (adding up to 1).
3. Define one of the alternatives as the **Reference Design.**
4. Have a team assign values for each alternative for each CTQ:
   - Compare each alternative to the Reference Design.
   - Assign one of the following values:
     - 0: alternative is comparable to the reference design
     - +1: alternative is better than the reference design
     - –1: alternative is worse than the reference design.
6. Calculate the score for each alternative, by adding the values.
   - Optionally. weight each {-1,0,1} by that CTQ's weight.

		Alternatives			
		Alternative A (Reference Design)	Alternative B	Alternative C	Alternative D
Criteria	Criteria 1	0	-1	-1	1
	Criteria 2	0	0	1	1
	Criteria 3	0	-1	-1	1
	Criteria 4	0	1	0	0
	Criteria 5	0	-1	0	-1
	Total Score	0	-2	-1	2

Pugh Matrix – Example – Buying a car



Pugh Matrix – Notes

Slide 1

1. The Pugh Matrix was invented by Stuart Pugh.
2. The values in the matrix do not need to be {-1,0,+1}, other commonly used values are {1,2,3} . The values can be used to indicate the amount of difference from the Reference Design.
3. Best practices:
   - Carefully choose the evaluation criteria.
   - A weighted Pugh matrix is usually more appropriate than an unweighted one – carefully choose the weights aligned with the customer needs.
   - Use a diverse team of 4-8 people to determine the values.
   - Document the value discussions.
4. Common failures
   - Incorrect selection criteria
   - Incomplete selection criteria
   - Unclear selection criteria

Slide 2

1. The example shows the same data evaluated using both a weighted and an unweighted Pugh matrix – the conclusion (best alternative) is the same in each case.
2. The computation for the unweighted Pugh matrix is very simple, just add up the {-1,0,1} values for each alternative.