**Analytic Hierarchy Process (AHP)**

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|  |  |  |
|  | Pair-wise Judgments |  |
|  | Consistent Judgments |  |
|  | Inconsistent Judgments |  |
|  |  |  |
|  | Decision Analysis |  |
|  | Decision Table |  |
|  | Decision Hierarchy |  |
|  |  |  |
|  | AHP |  |
|  | Examples |  |
|  | Sensitivity Analysis |  |
|  |  |  |

**AHP (Analytic Hierarchy Process)**

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|  | Goal | 🡪 |  |  |  |  |  | Goal | | | |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | Criteria | 🡪 |  | Criterion  A | |  | Criterion  B | |  |  | Criterion  C | |  | Criterion  D | |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | Criteria  Weights | 🡪 |  | #A | |  | #B | |  |  | #C | |  | #D | |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | Alternatives | 🡪 | Alternative-1 | #A1 | |  | #B1 | |  |  | #C1 | |  | #D1 | |  |
|  |  |  | Alternative-2 | #A2 | |  | #B2 | |  |  | #C2 | |  | #D2 | |  |
|  |  |  | Alternative-3 | #A3 | |  | #B3 | |  |  | #C3 | |  | #D3 | |  |
|  |  |  | Alternative-4 | #A4 | |  | #B4 | |  |  | #C4 | |  | #D4 | |  |
|  |  |  | Alternative-5 | #A6 | |  | #B5 | |  |  | #C5 | |  | #D5 | |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | Alternative | 🡪 | Alternative-1 |  |  |  |  | #1 | | | |  |  |  |  |  |
|  | Scores |  | Alternative-2 |  |  |  |  | #2 | | | |  |  |  |  |  |
|  |  |  | Alternative-3 |  |  |  |  | #3 | | | |  |  |  |  |  |
|  |  |  | Alternative-4 |  |  |  |  | #4 | | | |  |  |  |  |  |
|  |  |  | Alternative-5 |  |  |  |  | #5 | | | |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

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|  | **Scoring with Pair-wise Judgments** |  |

1. Assume the judgments: A=2B (A is two times more important than B)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| .  Let B=1. Then A=2.   |  |  |  | | --- | --- | --- | |  | Judgments | Normalized  Scores | | A | 2 | 2/3 | | B | 1 | 1/3 | | Sum | 3 | 1 |   OR   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | |  |  |  |  |  |  |  |  | | Matrix | A | B |  | Sum of  Normalized Columns |  | Normalized  Scores |  | | A | 1 | 2 |  | 1/1.5 + 2/3 = 4/3 |  | 2/3 |  | | B | 1/2 | 1 |  | 0.5/1.5 + 1/3 = 2/3 |  | 1/3 |  | | Sum | 3/2 | 3 |  | 2 |  | 1 |  | |  |  |  |  |  |  |  |  |   . . . |

2. Now consider judgments: A=2B, A=3C (To be consistent, 2B=3C)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| .  Let C=2. Then B=3 and A=6.   |  |  |  | | --- | --- | --- | |  | Judgments | Normalized  Scores | | A | 6 | 6/11 = 0.545 | | B | 3 | 3/11 = 0.273 | | C | 2 | 2/11 = 0.182 | | Sum | 11 | 1 |   OR   |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  |  |  |  |  |  |  |  |  |  | |  | Matrix | A | B | C |  | Sum of  Normalized Columns |  | Normalized  Scores |  | |  | A | 1 | 2 | 3 |  | 6/11+6/11+6/11=18/11 |  | 6/11=0.545 |  | |  | B | 1/2 | 1 | 3/2 |  | 3/11+3/11+3/11=9/11 |  | 3/11=0.273 |  | |  | C | 1/3 | 2/3 | 1 |  | 2/11+2/11+2/11=6/11 |  | 2/11=0.182 |  | |  | Sum | 11/6 | 11/3 | 11/2 |  | 33/11 |  | 1 |  | |  |  |  |  |  |  |  |  |  |  | |  | For a Consistent Judgment Matrix: Scores=1/Sum(Columns) | | | | | | | |  | |  |  |  |  |  |  |  |  |  |  |   . . . |

3. Now consider judgments: A=2B, A=3C, B=C 🡨Inconsistent judgment set.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| .   |  |  |  |  | | --- | --- | --- | --- | | This method cannot be used  with inconsistent judgment set. |  | Judgments | Normalized  Scores | | 🡪 | A |  |  | |  | B |  |  | |  | C |  |  | |  | Sum |  |  |   Use Matrix:   |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  |  |  |  |  |  |  |  |  |  | |  | Matrix | A | B | C |  | Sum of  Normalized Columns |  | Normalized  Scores |  | |  | A | 1 | 2 | 3 |  | 6/11+2/4+3/5=1.645 |  | 0.548 |  | |  | B | 1 / 2 | 1 | 1 |  | 3/11+1/4+1/5=0.723 |  | 0.241 |  | |  | C | 1 / 3 | 1 | 1 |  | 2/11+1/4+1/5=0.632 |  | 0.211 |  | |  | Sum | 11 / 6 | 4 | 5 |  | 3 |  | 1 |  | |  |  |  |  |  |  |  |  |  |  | |  | For an Inconsistent Judgment Matrix: Use Matrix. | | | | | | | |  | |  |  |  |  |  |  |  |  |  |  |   . . . |
|  |
| Comparison between Consistent and Inconsistent Scores:   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  |  |  |  |  | |  | Consistent  Normalized  Scores | Inconsistent  Normalized  Scores | Difference  (Consistent – Inconsistent) |  | |  | 6/11=0.545 | 0.548 | –0.003 |  | |  | 3/11=0.273 | 0.241 | 0.032 |  | |  | 2/11=0.182 | 0.211 | –0.029 |  | |  |  |  |  |  |   . . . |

4. Advantages of Method.

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| --- |
| 1. Human judgments are best represented in a pair-wise manner. 2. Inconsistent judgments are more realistic and appealing. 3. Decisions are documented with a technique that can be repeated, reported, and analyzed. 4. Large numbers of objectives can be accommodated in a structured manner. 5. ‘Sensitivity Analysis’ can be used for informed, analytic, and inclusive decision making. 6. Quantitative and qualitative information can be combined.   . . . |

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|  | **Decision Analysis** |  |

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| .  Site Selection Decision Problem  A corporation is in the decision process of selecting a location for their new manufacturing plant. Three locations are under consideration, SiteA, SiteB, SiteC.  From extended discussion, the board of directors has agreed on three factors to base their decision analysis.  Financial. Environmental. Political.  There is also agreement on the relative importance of these three factors. They feel that the financial indicators are twice as important as the environmental data and three times as important as the political information. However, they have judged that environmental and political data have equal importance.  In judging the locations, location A is four times as important as location B as far as the financial factors are concerned but location A is only one-fifth as attractive environmentally. Politically, location A and B are equal in importance.  Financially and environmentally, locations A and C have been judged to be of equal importance. Location A, however, is five times more important as location C politically.  Finally, location B is four and five times more important than location C politically and environmentally, respectively. Financially, location B is only one-tenth as important as location C.  Which location is indicated from the information available?  . |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Table |  |  |  |  |  |  |
|  |  | Criteria | Weights | SiteA | SiteB | SiteC |  |
|  |  | X: Financial | W1 | XA | XB | XC |  |
|  |  | Y: Environmental | W2 | YA | YB | YC |  |
|  |  | Z: Political | W3 | ZA | ZB | ZC |  |
|  |  | Scores |  | SA | SB | SC |  |
|  |  |  |  | ↑ |  |  |  |

Judgment of Importance of Criteria.

Let X=Financial, Y=Environmental, Z=Political.

Judgments: X=2Y, X=3Z, Y=Z. (Inconsistent)

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|  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  | Normalized |  |
|  |  | X | Y | Z |  |  | X | Y | Z | SumProduct | Scores |  |
|  | X |  | 2 | 3 |  | X | 1 | 2 | 3 | 1.645 | 0.548 |  |
|  | Y |  |  | 1 |  | Y | 0.5 | 1 | 1 | 0.723 | 0.241 |  |
|  | Z |  |  |  |  | Z | 0.333 | 1 | 1 | 0.632 | 0.211 |  |
|  |  |  |  |  |  | Sum | 1.833 | 4 | 5 |  |  |  |
|  |  |  |  |  |  | 1/Sum | 0.545 | 0.25 | 0.2 |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |

Judgments of Locations Relative to Criteria

Criterion X Judgments: A=4B, A=C, 10B=C. (Inconsistent)

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  | Normalized |  |
|  |  | A | B | C |  |  | A | B | C | SumProduct | Scores |  |
|  | A |  | 4 | 1 |  | A | 1 | 4 | 1 | 1.187 | 0.396 |  |
|  | B |  |  | 0.1 |  | B | 0.25 | 1 | 0.1 | 0.225 | 0.075 |  |
|  | C |  |  |  |  | C | 1.000 | 10 | 1 | 1.587 | 0.529 |  |
|  |  |  |  |  |  | Sum | 2.250 | 15 | 2.1 |  |  |  |
|  |  |  |  |  |  | 1/Sum | 0.444 | 0.067 | 0.476 |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |

Criterion Y Judgments: 5A=B, A=C, B=5C. (Consistent)

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|  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  | Normalized |  |
|  |  | A | B | C |  |  | A | B | C | SumProduct | Scores |  |
|  | A |  | 0.2 | 1 |  | A | 1 | 0.2 | 1 | 0.429 | 0.143 |  |
|  | B |  |  | 5 |  | B | 5 | 1 | 5 | 2.143 | 0.714 |  |
|  | C |  |  |  |  | C | 1.000 | 0 | 1 | 0.429 | 0.143 |  |
|  |  |  |  |  |  | Sum | 7.000 | 1.4 | 7 |  |  |  |
|  |  |  |  |  |  | 1/Sum | 0.143 | 0.714 | 0.143 |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |

Criterion Z Judgments: A=B, A=5C, B=4C. (Inconsistent)

|  |  |  |  |  |  |  |  |  |  |  |  |  |
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|  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  | Normalized |  |
|  |  | A | B | C |  |  | A | B | C | SumProduct | Scores |  |
|  | A |  | 1 | 5 |  | A | 1 | 1 | 5 | 1.399 | 0.466 |  |
|  | B |  |  | 4 |  | B | 1 | 1 | 4 | 1.299 | 0.433 |  |
|  | C |  |  |  |  | C | 0.200 | 0 | 1 | 0.302 | 0.101 |  |
|  |  |  |  |  |  | Sum | 2.200 | 2.25 | 10 |  |  |  |
|  |  |  |  |  |  | 1/Sum | 0.455 | 0.444 | 0.1 |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |

Represent Decision in Table Form and Hierarchical Form

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Table |  |  |  |  |  |  |
|  |  | Criteria | Weights | SiteA | SiteB | SiteC |  |
|  |  | X: Financial | 0.548 | 0.396 | 0.075 | 0.529 |  |
|  |  | Y: Environmental | 0.241 | 0.143 | 0.714 | 0.143 |  |
|  |  | Z: Political | 0.211 | 0.466 | 0.433 | 0.101 |  |
|  |  | Scores |  | 0.350 | 0.304 | 0.346 |  |
|  |  |  |  | ↑ |  |  |  |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Hierarchy | |  |  | | | | | |  |  |
|  |  |  |  | Focus. Site Selection | | | | | |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |
|  | Criteria: |  | Financial | |  | Environmental | |  | Political | |  |
|  |  |  | 0.548 | |  | 0.241 | |  | 0.211 | |  |
|  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |
|  | Objectives: | SiteA | 0.396 | |  | 0.143 | |  | 0.466 | |  |
|  |  | SiteB | 0.075 | |  | 0.714 | |  | 0.433 | |  |
|  |  | SiteC | 0.529 | |  | 0.143 | |  | 0.101 | |  |
|  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |
|  | Scores: |  |  |  |  | SiteA | 0.350 | ← |  |  |  |
|  |  |  |  |  |  | SiteB | 0.304 |  |  |  |  |
|  |  |  |  |  |  | SiteC | 0.346 |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |

Consistency

Consistency in Criteria Weights.

Let X=Financial, Y=Environmental, Z=Political.

Judgments: X=2Y, X=3Z, Y=Z. (Inconsistent)

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  | Normalized |  |
|  |  | X | Y | Z |  |  | X | Y | Z | SumProduct | Scores |  |
|  | X |  | 2 | 3 |  | X | 1 | 2 | 3 | 1.645 | 0.548 |  |
|  | Y |  |  | 1 |  | Y | 0.5 | 1 | 1 | 0.723 | 0.241 |  |
|  | Z |  |  |  |  | Z | 0.333 | 1 | 1 | 0.632 | 0.211 |  |
|  |  |  |  |  |  | Sum | 1.833 | 4 | 5 |  |  |  |
|  |  |  |  |  |  | 1/Sum | 0.545 | 0.25 | 0.2 |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |
|  |  |  |  |  | Normalized | Consistency |  |  |
|  |  | X | Y | Z | Scores | Measure |  |  |
|  | X | 1 | 2 | 3 | 0.548 | 3.030 |  |  |
|  | Y | 0.5 | 1 | 1 | 0.241 | 3.013 |  |  |
|  | Z | 0.333 | 1 | 1 | 0.211 | 3.012 |  |  |
|  | Scores | 0.548 | 0.241 | 0.211 | Average= | 3.018 | Index |  |
|  |  |  |  |  | n= | 3 | 0.58 |  |
|  |  |  |  |  | Ratio= | 0.016 |  |  |
|  |  |  |  |  |  |  |  |  |
|  | Consistency Measure for X: 3.030=(1\*(0.548)+2\*(0.241)+3\*(0.211))/0.548  Consistency Measure for Y: 3.013=(0.5\*(0.548)+1\*(0.241)+1\*(0.211))/0.241  Consistency Measure for Z: 3.012=(0.333\*(0.548)+1\*(0.241)+1\*(0.211))/0.211 | | | | | | |  |
|  |  |  |  |  |  |  |  |  |

Proposal Selection Example 1

Proposal Selection.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  | Alternatives | | | |  |
|  |  |  | A1: | A2: | A3: | A4: |  |
|  | Criteria | Weights | Proposal-1 | Proposal-2 | Proposal-3 | Proposal-4 |  |
|  | C1: Technical approach |  |  |  |  |  |  |
|  | C2: Management approach |  |  |  |  |  |  |
|  | C3: Past Performance |  |  |  |  |  |  |
|  | C4: Price |  |  |  |  |  |  |
|  | Score |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |

Consistent Judgments

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Criteria Weights** |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  | C1: Technical approach |  | C1= | 2 | C2 | OR | C1= | 2 | C2 |  |
|  | C2: Management approach |  | C2= | 4 | C3 |  | C1= | 8 | C3 |  |
|  | C3: Past Performance |  | C3= | 0.5 | C4 |  | C1= | 4 | C4 |  |
|  | C4: Price |  |  |  |  |  |  |  |  |  |
|  |  |  |  | C1 | C2 | C3 | C4 |  |  |  |
|  |  |  | C1 | 1 | 2 | 8 | 4 |  |  |  |
|  |  |  | C2 |  | 1 | 4 | 2 |  |  |  |
|  |  |  | C3 |  |  | 1 | 0.5 |  |  |  |
|  |  |  | C4 |  |  |  | 1 |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |

Consistent Judgments

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| C1: Technical approach | A1= | 0.5 | A2 | , | A1= | 1 | A3 | , | A1= | 3 | A4 |
| C2: Management approach | A1= | 5 | A2 | , | A1= | 1 | A3 | , | A1= | 2 | A4 |
| C3: Past Performance | A1= | 1.5 | A2 | , | A1= | 3 | A3 | , | A1= | 1.2 | A4 |
| C4: Price | A1= | 1 | A2 | , | A1= | 2 | A3 | , | A1= | 2 | A4 |

Proposal Selection Example 2

Proposal Selection.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  | Alternatives | | | |  |
|  |  |  | A1: | A2: | A3: | A4: |  |
|  | Criteria | Weights | Proposal-1 | Proposal-2 | Proposal-3 | Proposal-4 |  |
|  | C1: Technical approach |  |  |  |  |  |  |
|  | C2: Management approach |  |  |  |  |  |  |
|  | C3: Past Performance |  |  |  |  |  |  |
|  | C4: Price |  |  |  |  |  |  |
|  | Score |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |

Inconsistent Judgments

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Criteria Weights** |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  | C1: Technical approach |  | C1= | 2 | C2 | AND | C2= | 4 | C3 |  |
|  | C2: Management approach |  | C1= | 3 | C3 |  | C2= | 2 | C4 |  |
|  | C3: Past Performance |  | C1= | 6 | C4 |  | C3= | 1 | C4 |  |
|  | C4: Price |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |

Inconsistent Judgments

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| C1: Technical approach |  | A1= | 0.8 | A2 | AND | A2= | 2.5 | A3 |  |
|  |  | A1= | 1 | A3 |  | A2= | 3 | A4 |  |
|  |  | A1= | 2 | A4 |  | A3= | 1.5 | A4 |  |
|  |  |  |  |  |  |  |  |  |  |
| C2: Management approach |  | A1= | 4 | A2 | AND | A2= | 0.5 | A3 |  |
|  |  | A1= | 4 | A3 |  | A2= | 1 | A4 |  |
|  |  | A1= | 2 | A4 |  | A3= | 1 | A4 |  |
|  |  |  |  |  |  |  |  |  |  |
| C3: Past Performance |  | A1= | 2 | A2 | AND | A2= | 3 | A3 |  |
|  |  | A1= | 2 | A3 |  | A2= | 2 | A4 |  |
|  |  | A1= | 2.5 | A4 |  | A3= | 1 | A4 |  |
|  |  |  |  |  |  |  |  |  |  |
| C4: Price |  | A1= | 1.2 | A2 | AND | A2= | 1.5 | A3 |  |
|  |  | A1= | 1.4 | A3 |  | A2= | 2 | A4 |  |
|  |  | A1= | 1.8 | A4 |  | A3= | 1.2 | A4 |  |
|  |  |  |  |  |  |  |  |  |  |

Proposal Selection Example 3

Proposal Selection.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |
|  | Primary Criteria | Primary  Weights | Secondary Criteria | Secondary  Weights |  |
|  | C1: Technical approach |  | C1.1:Design |  |  |
|  |  |  | C1.2:Implementation |  |  |
|  |  |  | C1.3:Change Management |  |  |
|  |  |  |  |  |  |
|  | C2: Management approach |  | C2.1:Personnel |  |  |
|  |  |  | C2.2:Responsiveness |  |  |
|  |  |  | C2.3:Effectiveness |  |  |
|  |  |  |  |  |  |
|  | C3: Past Performance |  | C3.1:Technical |  |  |
|  |  |  | C3.2:Management |  |  |
|  |  |  |  |  |  |
|  | C4: Price |  | C4.1:Amount |  |  |
|  |  |  | C4.2:Fixed Price |  |  |
|  |  |  | C4.3:Competitive |  |  |
|  |  |  |  |  |  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | Alternatives | | |  |
|  |  |  |  |  | A1: | A2: | A3: |  |
|  | Primary  Criteria | Primary  Weights | Secondary  Criteria | Secondary  Weights | Proposal-1 | Proposal-2 | Proposal-3 |  |
|  | C1: |  | C1.1 |  |  |  |  |  |
|  |  |  | C1.2 |  |  |  |  |  |
|  |  |  | C1.3 |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  | C2: |  | C2.1 |  |  |  |  |  |
|  |  |  | C2.2 |  |  |  |  |  |
|  |  |  | C2.3 |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  | C3: |  | C3.1 |  |  |  |  |  |
|  |  |  | C3.2 |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  | C4: Price |  | C4.1 |  |  |  |  |  |
|  |  |  | C4.2 |  |  |  |  |  |
|  |  |  | C4.3 |  |  |  |  |  |
|  | Score |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |

**Example**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  | | --- | | World Influence |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  | Human  Resources | |  | Wealth | |  | Technology | |  | Trade | |  | Military  Strength | |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  | 0.043 | |  | 0.393 | |  | 0.228 | |  | 0.136 | |  | 0.199 | |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  | 0.409 | |  | 0.175 | |  | 0.032 | |  | 0.076 | |  | 0.070 | |  | 0.127 | |  | 0.112 | |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  | USA | |  | Russia | |  | China | |  | France | |  | UK | |  | Japan | |  | Germany | |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   . |