**EKLER**

**EK-1.** Her bir kritere göre tedarikçilerin önem ağırlıkları

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **C1** |  | KARAR VERİCİLER | | | | | | Bulanık Değer | | Kesin Değer |
| KV 1 | | KV2 | | KV3 | |
| S1 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.1083 |
| 0 | 0 | 0.1 | 0 | 0.1 | 0 | 0.0667 | 0.0000 |
| 0 | 0 | 0.1 | 0 | 0.1 | 0 | 0.0667 | 0.0000 |
| 0.1 | 0.5 | 0.3 | 0.5 | 0.3 | 0.5 | 0.2333 | 0.5000 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| S2 | 0.3 | 0.4 | 0.1 | 0.2 | 0.1 | 0.2 | 0.1667 | 0.2667 | 0.3575 |
| 0.5 | 0.5 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3667 | 0.3667 |
| 0.5 | 0.5 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3667 | 0.3667 |
| 0.7 | 0.6 | 0.5 | 0.4 | 0.5 | 0.4 | 0.5667 | 0.4667 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| S3 | 0.1 | 0.2 | 0.3 | 0.4 | 0.3 | 0.4 | 0.2333 | 0.3333 | 0.4225 |
| 0.3 | 0.3 | 0.5 | 0.5 | 0.5 | 0.5 | 0.4333 | 0.4333 |
| 0.3 | 0.3 | 0.5 | 0.5 | 0.5 | 0.5 | 0.4333 | 0.4333 |
| 0.5 | 0.4 | 0.7 | 0.6 | 0.7 | 0.6 | 0.6333 | 0.5333 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| S4 | 0.3 | 0.4 | 0.1 | 0.2 | 0.3 | 0.4 | 0.2333 | 0.3333 | 0.4225 |
| 0.5 | 0.5 | 0.3 | 0.3 | 0.5 | 0.5 | 0.4333 | 0.4333 |
| 0.5 | 0.5 | 0.3 | 0.3 | 0.5 | 0.5 | 0.4333 | 0.4333 |
| 0.7 | 0.6 | 0.5 | 0.4 | 0.7 | 0.6 | 0.6333 | 0.5333 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| S5 | 0.5 | 0.6 | 0.7 | 0.8 | 0.5 | 0.6 | 0.5667 | 0.6667 | 0.7413 |
| 0.7 | 0.7 | 0.9 | 0.9 | 0.7 | 0.7 | 0.7667 | 0.7667 |
| 0.7 | 0.7 | 0.9 | 0.9 | 0.7 | 0.7 | 0.7667 | 0.7667 |
| 0.9 | 0.8 | 1 | 0.95 | 0.9 | 0.8 | 0.9333 | 0.8500 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |

**EK-1. Devamı**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **C2** | S1 | 0.5 | 0.6 | 0.5 | 0.6 | 0.3 | 0.4 | 0.4333 | 0.5333 | 0.6175 |
| 0.7 | 0.7 | 0.7 | 0.7 | 0.5 | 0.5 | 0.6333 | 0.6333 |
| 0.7 | 0.7 | 0.7 | 0.7 | 0.5 | 0.5 | 0.6333 | 0.6333 |
| 0.9 | 0.8 | 0.9 | 0.8 | 0.7 | 0.6 | 0.8333 | 0.7333 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| S2 | 0.5 | 0.6 | 0.5 | 0.6 | 0.1 | 0.2 | 0.3667 | 0.4667 | 0.5525 |
| 0.7 | 0.7 | 0.7 | 0.7 | 0.3 | 0.3 | 0.5667 | 0.5667 |
| 0.7 | 0.7 | 0.7 | 0.7 | 0.3 | 0.3 | 0.5667 | 0.5667 |
| 0.9 | 0.8 | 0.9 | 0.8 | 0.5 | 0.4 | 0.7667 | 0.6667 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| S3 | 0.1 | 0.2 | 0.1 | 0.2 | 0.1 | 0.2 | 0.1000 | 0.2000 | 0.2925 |
| 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3000 | 0.3000 |
| 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3000 | 0.3000 |
| 0.5 | 0.4 | 0.5 | 0.4 | 0.5 | 0.4 | 0.5000 | 0.4000 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| S4 | 0 | 0 | 0 | 0 | 0.1 | 0.2 | 0.0333 | 0.0667 | 0.1808 |
| 0.1 | 0 | 0.1 | 0 | 0.3 | 0.3 | 0.1667 | 0.1000 |
| 0.1 | 0 | 0.1 | 0 | 0.3 | 0.3 | 0.1667 | 0.1000 |
| 0.3 | 0.5 | 0.3 | 0.5 | 0.5 | 0.4 | 0.3667 | 0.4667 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| S5 | 0.1 | 0.2 | 0 | 0 | 0 | 0 | 0.0333 | 0.0667 | 0.1808 |
| 0.3 | 0.3 | 0.1 | 0 | 0.1 | 0 | 0.1667 | 0.1000 |
| 0.3 | 0.3 | 0.1 | 0 | 0.1 | 0 | 0.1667 | 0.1000 |
| 0.5 | 0.4 | 0.3 | 0.5 | 0.3 | 0.5 | 0.3667 | 0.4667 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |

**EK-1. Devamı**

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| **C3** | S1 | 0.1 | 0.2 | 0.1 | 0.2 | 0.1 | 0.2 | 0.1000 | 0.2000 | 0.2925 |
| 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3000 | 0.3000 |
| 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3000 | 0.3000 |
| 0.5 | 0.4 | 0.5 | 0.4 | 0.5 | 0.4 | 0.5000 | 0.4000 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| S2 | 0 | 0 | 0.1 | 0.2 | 0.1 | 0.2 | 0.0667 | 0.1333 | 0.2367 |
| 0.1 | 0 | 0.3 | 0.3 | 0.3 | 0.3 | 0.2333 | 0.2000 |
| 0.1 | 0 | 0.3 | 0.3 | 0.3 | 0.3 | 0.2333 | 0.2000 |
| 0.3 | 0.5 | 0.5 | 0.4 | 0.5 | 0.4 | 0.4333 | 0.4333 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| S3 | 0.5 | 0.6 | 0.1 | 0.2 | 0.1 | 0.2 | 0.2333 | 0.3333 | 0.4225 |
| 0.7 | 0.7 | 0.3 | 0.3 | 0.3 | 0.3 | 0.4333 | 0.4333 |
| 0.7 | 0.7 | 0.3 | 0.3 | 0.3 | 0.3 | 0.4333 | 0.4333 |
| 0.9 | 0.8 | 0.5 | 0.4 | 0.5 | 0.4 | 0.6333 | 0.5333 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| S4 | 0.5 | 0.6 | 0.1 | 0.2 | 0.1 | 0.2 | 0.2333 | 0.3333 | 0.4225 |
| 0.7 | 0.7 | 0.3 | 0.3 | 0.3 | 0.3 | 0.4333 | 0.4333 |
| 0.7 | 0.7 | 0.3 | 0.3 | 0.3 | 0.3 | 0.4333 | 0.4333 |
| 0.9 | 0.8 | 0.5 | 0.4 | 0.5 | 0.4 | 0.6333 | 0.5333 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| S5 | 0.1 | 0.2 | 0.1 | 0.2 | 0 | 0 | 0.0667 | 0.1333 | 0.2367 |
| 0.3 | 0.3 | 0.3 | 0.3 | 0.1 | 0 | 0.2333 | 0.2000 |
| 0.3 | 0.3 | 0.3 | 0.3 | 0.1 | 0 | 0.2333 | 0.2000 |
| 0.5 | 0.4 | 0.5 | 0.4 | 0.3 | 0.5 | 0.4333 | 0.4333 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |

**EK-1. Devamı**

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **C4** | S1 | 0.5 | 0.6 | 0.1 | 0.2 | 0.3 | 0.4 | 0.3000 | 0.4000 | 0.4875 |
| 0.7 | 0.7 | 0.3 | 0.3 | 0.5 | 0.5 | 0.5000 | 0.5000 |
| 0.7 | 0.7 | 0.3 | 0.3 | 0.5 | 0.5 | 0.5000 | 0.5000 |
| 0.9 | 0.8 | 0.5 | 0.4 | 0.7 | 0.6 | 0.7000 | 0.6000 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| S2 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.1083 |
| 0 | 0 | 0.1 | 0 | 0.1 | 0 | 0.0667 | 0.0000 |
| 0 | 0 | 0.1 | 0 | 0.1 | 0 | 0.0667 | 0.0000 |
| 0.1 | 0.5 | 0.3 | 0.5 | 0.3 | 0.5 | 0.2333 | 0.5000 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| S3 | 0 | 0 | 0 | 0 | 0.1 | 0.2 | 0.0333 | 0.0667 | 0.1808 |
| 0.1 | 0 | 0.1 | 0 | 0.3 | 0.3 | 0.1667 | 0.1000 |
| 0.1 | 0 | 0.1 | 0 | 0.3 | 0.3 | 0.1667 | 0.1000 |
| 0.3 | 0.5 | 0.3 | 0.5 | 0.5 | 0.4 | 0.3667 | 0.4667 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| S4 | 0.3 | 0.4 | 0 | 0 | 0 | 0 | 0.1000 | 0.1333 | 0.2458 |
| 0.5 | 0.5 | 0.1 | 0 | 0.1 | 0 | 0.2333 | 0.1667 |
| 0.5 | 0.5 | 0.1 | 0 | 0.1 | 0 | 0.2333 | 0.1667 |
| 0.7 | 0.6 | 0.3 | 0.5 | 0.3 | 0.5 | 0.4333 | 0.5333 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| S5 | 0.1 | 0.2 | 0.1 | 0.2 | 0.1 | 0.2 | 0.1000 | 0.2000 | 0.2925 |
| 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3000 | 0.3000 |
| 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3000 | 0.3000 |
| 0.5 | 0.4 | 0.5 | 0.4 | 0.5 | 0.4 | 0.5000 | 0.4000 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |

**EK-1. Devamı**

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **C5** | S1 | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.3000 | 0.4000 | 0.4875 |
| 0.3 | 0.3 | 0.5 | 0.5 | 0.7 | 0.7 | 0.5000 | 0.5000 |
| 0.3 | 0.3 | 0.5 | 0.5 | 0.7 | 0.7 | 0.5000 | 0.5000 |
| 0.5 | 0.4 | 0.7 | 0.6 | 0.9 | 0.8 | 0.7000 | 0.6000 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| S2 | 0 | 0 | 0.1 | 0.2 | 0 | 0 | 0.0333 | 0.0667 | 0.1808 |
| 0.1 | 0 | 0.3 | 0.3 | 0.1 | 0 | 0.1667 | 0.1000 |
| 0.1 | 0 | 0.3 | 0.3 | 0.1 | 0 | 0.1667 | 0.1000 |
| 0.3 | 0.5 | 0.5 | 0.4 | 0.3 | 0.5 | 0.3667 | 0.4667 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| S3 | 0 | 0 | 0.1 | 0.2 | 0.1 | 0.2 | 0.0667 | 0.1333 | 0.2200 |
| 0 | 0 | 0.3 | 0.3 | 0.3 | 0.3 | 0.2000 | 0.2000 |
| 0 | 0 | 0.3 | 0.3 | 0.3 | 0.3 | 0.2000 | 0.2000 |
| 0.1 | 0.5 | 0.5 | 0.4 | 0.5 | 0.4 | 0.3667 | 0.4333 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| S4 | 0 | 0 | 0.1 | 0.2 | 0.3 | 0.4 | 0.1333 | 0.2000 | 0.3017 |
| 0.1 | 0 | 0.3 | 0.3 | 0.5 | 0.5 | 0.3000 | 0.2667 |
| 0.1 | 0 | 0.3 | 0.3 | 0.5 | 0.5 | 0.3000 | 0.2667 |
| 0.3 | 0.5 | 0.5 | 0.4 | 0.7 | 0.6 | 0.5000 | 0.5000 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| S5 | 0.3 | 0.4 | 0.1 | 0.2 | 0.3 | 0.4 | 0.2333 | 0.3333 | 0.4225 |
| 0.5 | 0.5 | 0.3 | 0.3 | 0.5 | 0.5 | 0.4333 | 0.4333 |
| 0.5 | 0.5 | 0.3 | 0.3 | 0.5 | 0.5 | 0.4333 | 0.4333 |
| 0.7 | 0.6 | 0.5 | 0.4 | 0.7 | 0.6 | 0.6333 | 0.5333 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |

**EK-1. Devamı**

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| **C6** | S1 | 0.5 | 0.6 | 0.5 | 0.6 | 0.5 | 0.6 | 0.5000 | 0.6000 | 0.6825 |
| 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7000 | 0.7000 |
| 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7000 | 0.7000 |
| 0.9 | 0.8 | 0.9 | 0.8 | 0.9 | 0.8 | 0.9000 | 0.8000 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| S2 | 0.5 | 0.6 | 0.1 | 0.2 | 0.1 | 0.2 | 0.2333 | 0.3333 | 0.4225 |
| 0.7 | 0.7 | 0.3 | 0.3 | 0.3 | 0.3 | 0.4333 | 0.4333 |
| 0.7 | 0.7 | 0.3 | 0.3 | 0.3 | 0.3 | 0.4333 | 0.4333 |
| 0.9 | 0.8 | 0.5 | 0.4 | 0.5 | 0.4 | 0.6333 | 0.5333 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| S3 | 0.1 | 0.2 | 0.3 | 0.4 | 0.1 | 0.2 | 0.1667 | 0.2667 | 0.3575 |
| 0.3 | 0.3 | 0.5 | 0.5 | 0.3 | 0.3 | 0.3667 | 0.3667 |
| 0.3 | 0.3 | 0.5 | 0.5 | 0.3 | 0.3 | 0.3667 | 0.3667 |
| 0.5 | 0.4 | 0.7 | 0.6 | 0.5 | 0.4 | 0.5667 | 0.4667 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| S4 | 0.3 | 0.4 | 0.1 | 0.2 | 0.1 | 0.2 | 0.1667 | 0.2667 | 0.3575 |
| 0.5 | 0.5 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3667 | 0.3667 |
| 0.5 | 0.5 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3667 | 0.3667 |
| 0.7 | 0.6 | 0.5 | 0.4 | 0.5 | 0.4 | 0.5667 | 0.4667 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| S5 | 0.5 | 0.6 | 0.1 | 0.2 | 0.5 | 0.6 | 0.3667 | 0.4667 | 0.5525 |
| 0.7 | 0.7 | 0.3 | 0.3 | 0.7 | 0.7 | 0.5667 | 0.5667 |
| 0.7 | 0.7 | 0.3 | 0.3 | 0.7 | 0.7 | 0.5667 | 0.5667 |
| 0.9 | 0.8 | 0.5 | 0.4 | 0.9 | 0.8 | 0.7667 | 0.6667 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |

**EK-1. Devamı**

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| **C7** | S1 | 0.5 | 0.6 | 0.7 | 0.8 | 0.7 | 0.8 | 0.6333 | 0.7333 | 0.8000 |
| 0.7 | 0.7 | 0.9 | 0.9 | 0.9 | 0.9 | 0.8333 | 0.8333 |
| 0.7 | 0.7 | 0.9 | 0.9 | 0.9 | 0.9 | 0.8333 | 0.8333 |
| 0.9 | 0.8 | 1 | 0.95 | 1 | 0.95 | 0.9667 | 0.9000 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| S2 | 0 | 0 | 0.1 | 0.2 | 0 | 0 | 0.0333 | 0.0667 | 0.1642 |
| 0 | 0 | 0.3 | 0.3 | 0.1 | 0 | 0.1333 | 0.1000 |
| 0 | 0 | 0.3 | 0.3 | 0.1 | 0 | 0.1333 | 0.1000 |
| 0.1 | 0.5 | 0.5 | 0.4 | 0.3 | 0.5 | 0.3000 | 0.4667 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| S3 | 0.3 | 0.4 | 0.1 | 0.2 | 0.1 | 0.2 | 0.1667 | 0.2667 | 0.3575 |
| 0.5 | 0.5 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3667 | 0.3667 |
| 0.5 | 0.5 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3667 | 0.3667 |
| 0.7 | 0.6 | 0.5 | 0.4 | 0.5 | 0.4 | 0.5667 | 0.4667 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| S4 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.1250 |
| 0.1 | 0 | 0.1 | 0 | 0.1 | 0 | 0.1000 | 0.0000 |
| 0.1 | 0 | 0.1 | 0 | 0.1 | 0 | 0.1000 | 0.0000 |
| 0.3 | 0.5 | 0.3 | 0.5 | 0.3 | 0.5 | 0.3000 | 0.5000 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| S5 | 0 | 0 | 0 | 0 | 0.1 | 0.2 | 0.0333 | 0.0667 | 0.1808 |
| 0.1 | 0 | 0.1 | 0 | 0.3 | 0.3 | 0.1667 | 0.1000 |
| 0.1 | 0 | 0.1 | 0 | 0.3 | 0.3 | 0.1667 | 0.1000 |
| 0.3 | 0.5 | 0.3 | 0.5 | 0.5 | 0.4 | 0.3667 | 0.4667 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |

**EK-1. Devamı**

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **C8** | S1 | 0.1 | 0.2 | 0.3 | 0.4 | 0.1 | 0.2 | 0.1667 | 0.2667 | 0.3575 |
| 0.3 | 0.3 | 0.5 | 0.5 | 0.3 | 0.3 | 0.3667 | 0.3667 |
| 0.3 | 0.3 | 0.5 | 0.5 | 0.3 | 0.3 | 0.3667 | 0.3667 |
| 0.5 | 0.4 | 0.7 | 0.6 | 0.5 | 0.4 | 0.5667 | 0.4667 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| S2 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.1083 |
| 0.1 | 0 | 0 | 0 | 0.1 | 0 | 0.0667 | 0.0000 |
| 0.1 | 0 | 0 | 0 | 0.1 | 0 | 0.0667 | 0.0000 |
| 0.3 | 0.5 | 0.1 | 0.5 | 0.3 | 0.5 | 0.2333 | 0.5000 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| S3 | 0.3 | 0.4 | 0.1 | 0.2 | 0.1 | 0.2 | 0.1667 | 0.2667 | 0.3575 |
| 0.5 | 0.5 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3667 | 0.3667 |
| 0.5 | 0.5 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3667 | 0.3667 |
| 0.7 | 0.6 | 0.5 | 0.4 | 0.5 | 0.4 | 0.5667 | 0.4667 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| S4 | 0.3 | 0.4 | 0.5 | 0.6 | 0.5 | 0.6 | 0.4333 | 0.5333 | 0.6175 |
| 0.5 | 0.5 | 0.7 | 0.7 | 0.7 | 0.7 | 0.6333 | 0.6333 |
| 0.5 | 0.5 | 0.7 | 0.7 | 0.7 | 0.7 | 0.6333 | 0.6333 |
| 0.7 | 0.6 | 0.9 | 0.8 | 0.9 | 0.8 | 0.8333 | 0.7333 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| S5 | 0.5 | 0.6 | 0.5 | 0.6 | 0.5 | 0.6 | 0.5000 | 0.6000 | 0.6825 |
| 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7000 | 0.7000 |
| 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7000 | 0.7000 |
| 0.9 | 0.8 | 0.9 | 0.8 | 0.9 | 0.8 | 0.9000 | 0.8000 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |

**EK-1. Devamı**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **C9** | S1 | 0.1 | 0.2 | 0.1 | 0.2 | 0 | 0 | 0.0667 | 0.1333 | 0.2367 |
| 0.3 | 0.3 | 0.3 | 0.3 | 0.1 | 0 | 0.2333 | 0.2000 |
| 0.3 | 0.3 | 0.3 | 0.3 | 0.1 | 0 | 0.2333 | 0.2000 |
| 0.5 | 0.4 | 0.5 | 0.4 | 0.3 | 0.5 | 0.4333 | 0.4333 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| S2 | 0.1 | 0.2 | 0.1 | 0.2 | 0.1 | 0.2 | 0.1000 | 0.2000 | 0.2925 |
| 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3000 | 0.3000 |
| 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3000 | 0.3000 |
| 0.5 | 0.4 | 0.5 | 0.4 | 0.5 | 0.4 | 0.5000 | 0.4000 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| S3 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.0917 |
| 0.1 | 0 | 0 | 0 | 0 | 0 | 0.0333 | 0.0000 |
| 0.1 | 0 | 0 | 0 | 0 | 0 | 0.0333 | 0.0000 |
| 0.3 | 0.5 | 0.1 | 0.5 | 0.1 | 0.5 | 0.1667 | 0.5000 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| S4 | 0.1 | 0.2 | 0 | 0 | 0.1 | 0.2 | 0.0667 | 0.1333 | 0.2367 |
| 0.3 | 0.3 | 0.1 | 0 | 0.3 | 0.3 | 0.2333 | 0.2000 |
| 0.3 | 0.3 | 0.1 | 0 | 0.3 | 0.3 | 0.2333 | 0.2000 |
| 0.5 | 0.4 | 0.3 | 0.5 | 0.5 | 0.4 | 0.4333 | 0.4333 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| S5 | 0.5 | 0.6 | 0.1 | 0.2 | 0.3 | 0.4 | 0.3000 | 0.4000 | 0.4875 |
| 0.7 | 0.7 | 0.3 | 0.3 | 0.5 | 0.5 | 0.5000 | 0.5000 |
| 0.7 | 0.7 | 0.3 | 0.3 | 0.5 | 0.5 | 0.5000 | 0.5000 |
| 0.9 | 0.8 | 0.5 | 0.4 | 0.7 | 0.6 | 0.7000 | 0.6000 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |

**EK -1. Devamı**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **C10** | S1 | 0.3 | 0.4 | 0.5 | 0.6 | 0.3 | 0.4 | 0.3667 | 0.4667 | 0.5525 |
| 0.5 | 0.5 | 0.7 | 0.7 | 0.5 | 0.5 | 0.5667 | 0.5667 |
| 0.5 | 0.5 | 0.7 | 0.7 | 0.5 | 0.5 | 0.5667 | 0.5667 |
| 0.7 | 0.6 | 0.9 | 0.8 | 0.7 | 0.6 | 0.7667 | 0.6667 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| S2 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.1250 |
| 0.1 | 0 | 0.1 | 0 | 0.1 | 0 | 0.1000 | 0.0000 |
| 0.1 | 0 | 0.1 | 0 | 0.1 | 0 | 0.1000 | 0.0000 |
| 0.3 | 0.5 | 0.3 | 0.5 | 0.3 | 0.5 | 0.3000 | 0.5000 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| S3 | 0 | 0 | 0 | 0 | 0.1 | 0.2 | 0.0333 | 0.0667 | 0.1642 |
| 0.1 | 0 | 0 | 0 | 0.3 | 0.3 | 0.1333 | 0.1000 |
| 0.1 | 0 | 0 | 0 | 0.3 | 0.3 | 0.1333 | 0.1000 |
| 0.3 | 0.5 | 0.1 | 0.5 | 0.5 | 0.4 | 0.3000 | 0.4667 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| S4 | 0.1 | 0.2 | 0.3 | 0.4 | 0.1 | 0.2 | 0.1667 | 0.2667 | 0.3575 |
| 0.3 | 0.3 | 0.5 | 0.5 | 0.3 | 0.3 | 0.3667 | 0.3667 |
| 0.3 | 0.3 | 0.5 | 0.5 | 0.3 | 0.3 | 0.3667 | 0.3667 |
| 0.5 | 0.4 | 0.7 | 0.6 | 0.5 | 0.4 | 0.5667 | 0.4667 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| S5 | 0.1 | 0.2 | 0 | 0 | 0.1 | 0.2 | 0.0667 | 0.1333 | 0.2367 |
| 0.3 | 0.3 | 0.1 | 0 | 0.3 | 0.3 | 0.2333 | 0.2000 |
| 0.3 | 0.3 | 0.1 | 0 | 0.3 | 0.3 | 0.2333 | 0.2000 |
| 0.5 | 0.4 | 0.3 | 0.5 | 0.5 | 0.4 | 0.4333 | 0.4333 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |
| 1 | 0.9 | 1 | 0.9 | 1 | 0.9 | 1.0000 | 0.9000 |

**EK-2.** ÇATDP GAMS Modeli

Sets

i parcalar/i1,i2,i3,i4,i5/

j tedarikciler/j1,j2,j3,j4,j5/

k indirim aralığı /k1,k2,k3/;

Parameter

C(j)'production capacity of supplier j'/j1 4300, j2 3375, j3 4000, j4 3050, j5 2400/

R(j)'tedarikci risk orani'/j1 0.2705, j2 0.1357, j3 0.1778, j4 0.2008, j5 0.2183/

D(i) 'firmanın aylık ürün talepleri' /i1 1223, i2 2446, i3 1223, i4 2446, i5 2446/

G(j) 'tedarikci güvenilirligi' / j1 0.875, j2 0.9893, j3 0.958, j4 0.935, j5 0.967 /

B(j) 'delivery performance' / j1 0.90, j2 0.87, j3 0.97, j4 0.95, j5 0.92 /

H(j) 'tedarikci hatali parca orani' /j1 0.0001, j2 0.00008, j3 0.00016, j4 0.00018, j5 0.00025/

E(j) 'teslim zamani'/ j1 20.11, j2 30.11, j3 12.54, j4 13.10, j5 13.70/;

Table

L(i,j,k)

k1 k2 k3

i1.j1 0 400 800

i1.j2 0 400 800

i1.j3 0 400 800

i1.j4 0 400 800

i1.j5 0 400 800

i2.j1 0 400 800

i2.j2 0 400 800

i2.j3 0 400 800

i2.j4 0 400 800

i2.j5 0 400 800

i3.j1 0 400 800

i3.j2 0 400 800

i3.j3 0 400 800

i3.j4 0 400 800

i3.j5 0 400 800

i4.j1 0 400 800

i4.j2 0 400 800

i4.j3 0 400 800

i4.j4 0 400 800

i4.j5 0 400 800

i5.j1 0 400 800

i5.j2 0 400 800

i5.j3 0 400 800

i5.j4 0 400 800

i5.j5 0 400 800;

**Ek-2. Devamı**

Table

U(i,j,k)

k1 k2 k3

i1.j1 400 800 3000

i1.j2 400 800 3000

i1.j3 400 800 3000

i1.j4 400 800 3000

i1.j5 400 800 3000

i2.j1 400 800 3000

i2.j2 400 800 3000

i2.j3 400 800 3000

i2.j4 400 800 3000

i2.j5 400 800 3000

i3.j1 400 800 3000

i3.j2 400 800 3000

i3.j3 400 800 3000

i3.j4 400 800 3000

i3.j5 400 800 3000

i4.j1 400 800 3000

i4.j2 400 800 3000

i4.j3 400 800 3000

i4.j4 400 800 3000

i4.j5 400 800 3000

i5.j1 400 800 3000

i5.j2 400 800 3000

i5.j3 400 800 3000

i5.j4 400 800 3000

i5.j5 400 800 3000;

Table

P(i,j,k) 'satin alma maliyeti'

k1 k2 k3

i1.j1 400 392 380

i1.j2 425 416.5 403.8

i1.j3 375 367.5 356.3

i1.j4 390 382.2 370.5

i1.j5 380 372.4 361

i2.j1 120 117.6 114

i2.j2 127 124.5 120.7

i2.j3 112 109.8 106.4

i2.j4 117 114.7 111.2

i2.j5 114 111.7 108.3

i3.j1 280 274.4 266

i3.j2 297 291.1 282.2

i3.j3 262 256.8 248.9

i3.j4 273 267.5 259.4

i3.j5 266 260.7 252.7

i4.j1 40 39.2 38

i4.j2 42 41.2 39.9

i4.j3 37 36.3 35.2

i4.j4 39 38.2 37.1

i4.j5 38 37.2 36.1

**Ek-2. Devamı**

i5.j1 80 78.4 76

i5.j2 85 83.3 80.8

i5.j3 75 73.5 71.3

i5.j4 78 76.4 74.1

i5.j5 76 74.5 72.2;

Table

T(i,j,k) 'tasima maliyeti'

k1 k2 k3

i1.j1 3.125 3.125 3.125

i1.j2 6.25 6.25 6.25

i1.j3 3.125 3.125 3.125

i1.j4 2.34 2.34 2.34

i1.j5 2.34 2.34 2.34

i2.j1 1.625 1.625 1.625

i2.j2 3.125 3.125 3.125

i2.j3 1.625 1.625 1.625

i2.j4 1.17 1.17 1.17

i2.j5 1.17 1.17 1.17

i3.j1 3.125 3.125 3.125

i3.j2 6.25 6.25 6.25

i3.j3 3.125 3.125 3.125

i3.j4 2.34 2.34 2.34

i3.j5 2.34 2.34 2.34

i4.j1 1.625 1.625 1.625

i4.j2 3.125 3.125 3.125

i4.j3 1.625 1.625 1.625

i4.j4 1.17 1.17 1.17

i4.j5 1.17 1.17 1.17

i5.j1 1.625 1.625 1.625

i5.j2 3.125 3.125 3.125

i5.j3 1.625 1.625 1.625

i5.j4 1.17 1.17 1.17

i5.j5 1.17 1.17 1.17;

Table

m(i,j) min siparis miktari

j1 j2 j3 j4 j5

i1 284 262 220 148 136

i2 568 524 440 296 272

i3 284 262 220 148 136

i4 568 524 440 296 272

i5 568 524 440 296 272 ;

Scalar Ex 'Müsterinin belirledigi teslimat süresi' /96/;

Scalar Hx 'Hatali parca orani siniri'/0.005/;

Scalar N 'Büyük bir sayi'/10000/;

**Ek-2. Devamı**

Variable

z1

Q(i,j,k)'j tedarikcisinden saglanan i parcasinin siparis miktari'

Y(i,j,k)'i parcasının j tedarikçisinden tedarik edilip edilmemesi';

Positive variable

Ax;

Integer variable

Q(i,j,k)'j tedarikcisinden saglanan i parcasinin siparis miktari';

Binary variable

Y(i,j,k) 'i parcasının j tedarikçisinden tedarik edilip edilmemesi';

set amaclar /maliyet,risk,delivery/;

Equation

memnuniyet\_amac

maliyet\_amac 'toplam siparis maliyetinin minimizasyonu'

risk\_amac 'tedarikci risk minimizasyonu'

teslimat\_amac 'tedarikci teslimat performansı maksimizasyonu'

guvenirlilik\_amac 'tedarikci guvenilirliği maksimizasyonu'

talep 'her ürün için talep miktarının yerine getirilme kisiti'

kapasite 'sipariş edilen toplam ürün sayısının kapasite kisiti'

hatali\_parca 'ürünlerin ortalama küsür yüzdesinin belirli bir sınırı asmama kisiti'

teslim\_zamani 'secilen tedarikcilerin ortalama teslim süresinin istenen genel teslim süresinden daha az olması kisiti'

siparis\_verme 'siparis verilen parcanin belli miktarinin belli tedarikciden saglanma kisiti'

siparis\_iliskisi 'siparis miktari ve siparis tahsisi degiskenleri arasindaki iliski kisiti'

kisit1

kisit2

kisit3

kisit4;

memnuniyet\_amac.. z1=e=Ax;

maliyet\_amac.. sum ((i,j,k),P(i,j,k)\*Q(i,j,k)) + sum ((i,j,k),T(i,j,k)\*Q(i,j,k))=l=2392099.8550

1097296.435\*Ax;

**Ek-2. Devamı**

risk\_amac.. sum((i,j,k), R(j)\*Q(i,j,k))=l=3468.6975-1815.7828\*Ax;

teslimat\_amac.. sum ((i,j,k),B(j)\*Q(i,j,k))=g=9104.80+6686.95\*Ax;

guvenirlilik\_amac(i).. sum((j,k),G(j)\*Y(i,j,k))=g=0.95;

talep(i) ..sum((j,k),Q(i,j,k))=g=D(i);

kapasite(j) .. sum ((i,k),Q(i,j,k))=l=C(j);

hatali\_parca(i) .. sum ((j,k),H(j)\* Y(i,j,k))=l= Hx;

teslim\_zamani(i) .. sum ((j,k), E(j)\*Y(i,j,k))=l=Ex;

siparis\_verme(i,j,k) .. Q(i,j,k) =g= m(i,j)\*Y(i,j,k);

siparis\_iliskisi(i,j,k).. Q(i,j,k) =l= N\*Y(i,j,k);

kisit1(i,j).. sum (k,Y(i,j,k))=l=1;

kisit4 (i).. sum ((j,k),Y(i,j,k))=g=2;

kisit2 (i,j,k).. Q(i,j,k)=l=U(i,j,k)\*Y(i,j,k);

kisit3 (i,j,k).. Q(i,j,k)=g=L(i,j,k)\*Y(i,j,k);

Model siparis\_tahsisi /all/;

option mip=Lindo;

solve siparis\_tahsisi using mip minimizing z1;

solve siparis\_tahsisi using mip minimizing z2;

solve siparis\_tahsisi using mip maximizing z3;

**EK-3.** Şans Kısıtlı ÇATDP GAMS Modeli

Sets

i parcalar/i1,i2,i3,i4,i5/

j tedarikciler/j1,j2,j3,j4,j5/

k indirim aralığı /k1,k2,k3/;

Parameter

C(j)'production capacity of supplier j'/j1 4300, j2 3375, j3 4000, j4 3050, j5 2400/

R(j)'tedarikci risk orani'/j1 0.2705, j2 0.1357, j3 0.1778, j4 0.2008, j5 0.2183/

D(i) 'firmanın aylık ürün talepleri' /i1 1798, i2 3596, i3 1798, i4 3596, i5 3596/

G(j) 'tedarikci güvenilirligi' / j1 0.875, j2 0.9893, j3 0.958, j4 0.935, j5 0.967 /

B(j) 'delivery performance' / j1 0.90, j2 0.87, j3 0.97, j4 0.95, j5 0.92 /

H(j) 'tedarikci hatali parca orani' /j1 0.0001, j2 0.00008, j3 0.00016, j4 0.00018, j5 0.00025/

E(j) 'teslim zamani'/ j1 20.11, j2 30.11, j3 12.54, j4 13.10, j5 13.70/

Var(j)'varyans' /j1 2.108, j2 2.218, j3 1.521, j4 2.342, j5 2.048/;

Table

L(i,j,k)

k1 k2 k3

i1.j1 0 400 800

i1.j2 0 400 800

i1.j3 0 400 800

i1.j4 0 400 800

i1.j5 0 400 800

i2.j1 0 400 800

i2.j2 0 400 800

i2.j3 0 400 800

i2.j4 0 400 800

i2.j5 0 400 800

i3.j1 0 400 800

i3.j2 0 400 800

i3.j3 0 400 800

i3.j4 0 400 800

i3.j5 0 400 800

i4.j1 0 400 800

i4.j2 0 400 800

i4.j3 0 400 800

i4.j4 0 400 800

i4.j5 0 400 800

i5.j1 0 400 800

i5.j2 0 400 800

i5.j3 0 400 800

i5.j4 0 400 800

i5.j5 0 400 800;

**Ek-3. Devamı**

Table

U(i,j,k)

k1 k2 k3

i1.j1 400 800 3000

i1.j2 400 800 3000

i1.j3 400 800 3000

i1.j4 400 800 3000

i1.j5 400 800 3000

i2.j1 400 800 3000

i2.j2 400 800 3000

i2.j3 400 800 3000

i2.j4 400 800 3000

i2.j5 400 800 3000

i3.j1 400 800 3000

i3.j2 400 800 3000

i3.j3 400 800 3000

i3.j4 400 800 3000

i3.j5 400 800 3000

i4.j1 400 800 3000

i4.j2 400 800 3000

i4.j3 400 800 3000

i4.j4 400 800 3000

i4.j5 400 800 3000

i5.j1 400 800 3000

i5.j2 400 800 3000

i5.j3 400 800 3000

i5.j4 400 800 3000

i5.j5 400 800 3000;

Table

P(i,j,k) 'satin alma maliyeti'

k1 k2 k3

i1.j1 400 392 380

i1.j2 425 416.5 403.8

i1.j3 375 367.5 356.3

i1.j4 390 382.2 370.5

i1.j5 380 372.4 361

i2.j1 120 117.6 114

i2.j2 127 124.5 120.7

i2.j3 112 109.8 106.4

i2.j4 117 114.7 111.2

i2.j5 114 111.7 108.3

i3.j1 280 274.4 266

i3.j2 297 291.1 282.2

i3.j3 262 256.8 248.9

i3.j4 273 267.5 259.4

i3.j5 266 260.7 252.7

i4.j1 40 39.2 38

i4.j2 42 41.2 39.9

i4.j3 37 36.3 35.2

i4.j4 39 38.2 37.1

i4.j5 38 37.2 36.1

i5.j1 80 78.4 76

i5.j2 85 83.3 80.8

**Ek-3. Devamı**

i5.j3 75 73.5 71.3

i5.j4 78 76.4 74.1

i5.j5 76 74.5 72.2;

Table

T(i,j,k )'tasima maliyeti'

k1 k2 k3

i1.j1 3.125 3.125 3.125

i1.j2 6.25 6.25 6.25

i1.j3 3.125 3.125 3.125

i1.j4 2.34 2.34 2.34

i1.j5 2.34 2.34 2.34

i2.j1 1.625 1.625 1.625

i2.j2 3.125 3.125 3.125

i2.j3 1.625 1.625 1.625

i2.j4 1.17 1.17 1.17

i2.j5 1.17 1.17 1.17

i3.j1 3.125 3.125 3.125

i3.j2 6.25 6.25 6.25

i3.j3 3.125 3.125 3.125

i3.j4 2.34 2.34 2.34

i3.j5 2.34 2.34 2.34

i4.j1 1.625 1.625 1.625

i4.j2 3.125 3.125 3.125

i4.j3 1.625 1.625 1.625

i4.j4 1.17 1.17 1.17

i4.j5 1.17 1.17 1.17

i5.j1 1.625 1.625 1.625

i5.j2 3.125 3.125 3.125

i5.j3 1.625 1.625 1.625

i5.j4 1.17 1.17 1.17

i5.j5 1.17 1.17 1.17;

Table

m(i,j) min siparis miktari

j1 j2 j3 j4 j5

i1 284 262 220 148 136

i2 568 524 440 296 272

i3 284 262 220 148 136

i4 568 524 440 296 272

i5 568 524 440 296 272 ;

Scalar Ex 'Müsterinin belirledigi teslimat süresi' /96/;

Scalar Hx 'Hatali parca orani siniri'/0.005/;

Scalar N 'Büyük bir sayi'/10000/;

Scalar ND /1.645/;

**Ek-3. Devamı**

Variable

z1

z2

z3

Q(i,j,k)'j tedarikcisinden saglanan i parcasinin siparis miktari'

Y(i,j,k)'i parcasının j tedarikçisinden tedarik edilip edilmemesi';

Integer variable

Q(i,j,k)'j tedarikcisinden saglanan i parcasinin siparis miktari';

Binary variable

Y(i,j,k) 'i parcasının j tedarikçisinden tedarik edilip edilmemesi';

Set amaclar /maliyet,risk,delivery/;

Equation

maliyet\_amac 'toplam siparis maliyetinin minimizasyonu'

risk\_amac 'tedarikci risk minimizasyonu'

teslimat\_amac 'tedarikci teslimat performansı maksimizasyonu'

guvenirlilik\_amac 'tedarikci guvenilirliği maksimizasyonu'

talep 'her ürün için talep miktarının yerine getirilme kisiti'

kapasite 'sipariş edilen toplam ürün sayısının kapasite kisiti'

hatali\_parca 'ürünlerin ortalama küsür yüzdesinin belirli bir sınırı asmama kisiti'

teslim\_zamani 'secilen tedarikcilerin ortalama teslim süresinin istenen genel teslim süresinden daha az olması kisiti'

siparis\_verme 'siparis verilen parcanin belli miktarinin belli tedarikciden saglanma kisiti'

siparis\_iliskisi 'siparis miktari ve siparis tahsisi degiskenleri arasindaki iliski kisiti'

kisit1

kisit2

kisit3

kisit4

kisit5;

maliyet\_amac .. z1=e=sum ((i,j,k),P(i,j,k)\*Q(i,j,k)) + sum ((i,j,k),T(i,j,k)\*Q(i,j,k));

risk\_amac.. z2=e=sum((i,j,k), R(j)\*Q(i,j,k));

**Ek-3. Devamı**

teslimat\_amac.. z3=e=sum ((i,j,k),B(j)\*Q(i,j,k));

guvenirlilik\_amac(i).. sum((j,k),G(j)\*Y(i,j,k))=g=0.95;

talep(i) ..sum((j,k),Q(i,j,k))=g=D(i);

kapasite(j) .. sum ((i,k),Q(i,j,k))=l=C(j);

hatali\_parca(i) .. sum ((j,k),H(j)\* Y(i,j,k))=l= Hx;

kisit5(i).. sum (j,Var(j)\*Var(j))=l=sum (j,Var(j))\*sum (j,Var(j));

teslim\_zamani(i) .. sum ((j,k), E(j)\*Y(i,j,k))+ ND\*sum((j,k), Var(j)\*Y(i,j,k))=l=Ex;

siparis\_verme(i,j,k) .. Q(i,j,k) =g= m(i,j)\*Y(i,j,k);

siparis\_iliskisi(i,j,k).. Q(i,j,k) =l= N\*Y(i,j,k);

kisit1(i,j).. sum (k,Y(i,j,k))=l=1;

kisit4 (i).. sum ((j,k),Y(i,j,k))=g=2;

kisit2 (i,j,k).. Q(i,j,k)=l=U(i,j,k)\*Y(i,j,k);

kisit3 (i,j,k).. Q(i,j,k)=g=L(i,j,k)\*Y(i,j,k);

Model siparis\_tahsisi /all/;

option optcr=0.00;

solve siparis\_tahsisi using mip minimizing z1;

solve siparis\_tahsisi using mip minimizing z2;

solve siparis\_tahsisi using mip maximizing z3;