A zero-sum economic game

Walmart and KMart are each planning to build a store in an area with three towns, I, II and III. Town I has 45% of the area's population, and is 10 miles from town II and 20 from town III. Towns II and III have 35% and 20% of the area's population, respectively, and are 15 miles apart.

Market research shows that 65% of shoppers who have to choose between equidistant stores will choose Walmart. If shoppers have to choose between a nearby Walmart and a further away KMart, 90% will choose Walmart. If KMart is closer, 40% will still choose Walmart.

Because it is too small, Walmart will not build in town III. This is not a secret policy, and nor is the market research.

The payoff matrix

Assuming that shoppers loyally choose exactly one store, this is a zero-sum game, with the following payoff matrix:

	K_I	K_{II}	K_{III}
W_I	65	62.5	80
W_{II}	67.5	65	80

For example, if both stores locate in town I, then Walmart will receive 65% of the business in the area, so the W_I-K_I entry is 65. If Walmart locates in town I and KMart in town II, then Walmart receives 90% of the business from town I, and 40% of the business from each of the remaining towns, so the W_I-K_{II} entry is (90)(.45) + (40)(.55) = 62.5. If Walmart locates in town I and KMart in town III, then Walmart receives 90% of the business from towns I and II, and 40% of the business from town III, so the W_I-K_{III} entry is (90)(.8) + (40)(.2) = 80.