

and 600 respectively. The chance of success is estimated to be 50 per cent for both the HC-500 and HC-600 developments, so that the expected payoffs, if each is developed alone, are 150 and 250 respectively. The expected payoff for developing both, however, is more than half the estimated payoff if both developments are successful. With the assumed probabilities there is one chance in four that both will be successful (payoff 600), one in four that neither will succeed (payoff 0), one in four that only the HC-500 (payoff 300), and one in four that only the HC-600 (payoff 500) will be successful. The average expectancy is 350. In the example the preferred alternative is to develop both, which promises an expected net return worth 200 — 50 more than if only the HC-600 is developed.

Two points must be stressed in connection with this example. First, there is a spurious air of precision about the figures in the table. All are the roughest kind of estimates. The uncertainties clouding the estimated payoffs have been discussed in Chapters 8, 10, and 11. There are similar uncertainties regarding development costs, which frequently exceed estimates by factors of two, three, or more. And the 50 per cent estimate of chance of success is obviously a shot in the dark; clearly there are degrees of success, and also clearly the chance of success is a function of the cost of development — of how much we are willing to pay to insure success. Most developments can be made successful if we are willing to spend enough time and money on them. Moreover, entries in the table will usually be more uncertain, not less, when we are concerned with weapon systems rather than cargo transports. The HC-500 and HC-600 are apparently fairly straightforward advances on earlier transports. Their payoffs are essentially of the cost-saving variety. If the physical and performance characteristics of the transports are about as predicted, there is little doubt that these economies (payoffs) will in fact be realized. The weapon system, however, may well represent a considerably greater advance in the state of the art, which will make the outcome as well as time and cost highly unpredictable. Moreover, there is likely to be great uncertainty regarding the military worth of the performance characteristics even if these turn out as predicted — for reasons elaborated in Chapter 10. We cannot really know in 1960 how much it will be worth in a bombing campaign in 1970 to have bombers that will fly at Mach 4 rather than at Mach 2. The worth will depend upon the character of, say, Soviet air defenses in 1970, which will depend in part upon the success of Soviet developments not yet undertaken. Mach 4 might make the difference between being able to penetrate and not being able to penetrate; or it might have trivial or even negative²⁰ value.

²⁰ Infra-red devices are *more* effective in detecting the higher speed power plants and in directing defense missiles into them.