Henry Ford was aware of the cost of flexibility. He wrote:

"Therefore in 1909 I announced one morning, without any previous warning, that in the future we were going to build only one model, that the model was going to be "Model T," and that the chassis would be exactly the same for all cars, and I remarked:

'Any customer can have a car painted any colour that he wants so long as it is black.'" [43].

Ford knew that, all other things equal, he could sell more cars if he produced red and black than if he made only black. But he also knew that if he produced red cars, it would make black cars more expensive. Flexibility has three (at least) types of costs: overhead, information and error. These can be illustrated with an example.

Imagine you are a bird nesting on the side of a mountain. The weather varies unpredictably from day to day: 50% of the days are hot, and 50% are cold. Every morning you choose to spend the day hunting for food either on the mountaintop or in the valley. If you go to the mountain on a cold day, you freeze to death; if you go to the valley on a hot day you die of heat exhaustion. From the temperature in the morning you can guess the likely weather today with 80% accuracy. Flexibility clearly benefits you. By choosing to go to the mountain on hot mornings and to go to the valley on cold mornings, you have an 80% chance of surviving the day. If you always went to one or the other, your chance would only be 50%.

Now, suppose that one year the climate changes. From that time on, the probability of a cold day is 10% and hot day 90%. If you continue to follow your strategy of assessing the temperature every morning and responding accordingly, you will now spend 74% of your days on the mountain, and your daily survival probability will remain 80%. In one sense, this is a triumph for flexibility. With no genetic change, you have adjusted your behavior to the changed environment and suffered no ill effect. But compare your strategy with that of a mutant bird who goes to the mountain every day. In the old climate, her survival probability would have been 50%, and the mutation would have been eliminated by competition with more flexible birds like you. Now, however, her probability of survival is 90%, and the future belongs to her descendants. Her error cost, the selective disadvantage that results from incorrect decisions, is lower than yours, and as a result she wins. Error cost exists when consequential behavioral decisions are based on imperfect information.

In fact, her fitness may be improved by even more than the reduction in error cost. Suppose, to assess the weather with 80% accuracy, you need to wait until the sun rises. She, on the other hand, can fly to the mountaintop before sunrise and have first pick of the insects that fly at dawn. Your loss of this opportunity is information cost, incurred in exchange for information about the weather. Furthermore, she could nest closer to the mountaintop, where she would have less flying to do, and therefore could get along with smaller flight muscles. Your powerful and energetically expensive flight muscles, which give you the capacity to pursue a different strategy every day, are an overhead cost.

This example is unrealistically simple. It does, however, show how flexibility may increase or decrease fitness, depending on circumstances. In the real world, in which information is often expensive and usually imperfect, the best strategies will tend to be those that match flexibility to the range of variation commonly encountered. Kussell and Leibler [44] have modeled tradeoffs between information costs and flexibility.