and tend to claim authority by presenting their work as purely deductive (Kuhn 1962; Latour 1987). But it really isn't, and it fundamentally can't be.

Deduction and induction are the two forms of reasoning that we have at our disposal to predict and explain real-world phenomena, and they have driven our understanding of the world immensely. But deduction and induction are not enough if we want to *make* something. If we want to create valuable new "things," as in design and the other productive professions, the basic pattern of reasoning is called "abduction." In abduction, we set out to create a new "what"—a new "element" for the problem situation—so that the interactions in the system lead to a desired outcome. Abduction comes in two forms. In both forms, we already know at the beginning of the process something about the outcome of the equation; that is, we have an idea about the value we aim to achieve with the creation of the outcome.

Normal abduction—solid problem-solving, based on experience

In normal abduction, we know the result, the value we want to achieve through the desired outcome, and also the "how," a pattern of relationships that will help achieve the value we seek. The missing element is a "what" (an object, a service, a system), which still needs to be created. For example, faced with an undesirable situation of late-night violence in Kings Cross, we can choose to work within the established pattern of relationships for crime reduction, and send more police into the area in the early hours of the morning. Or we could—still within the same pattern—set up a training program for security personnel in which they learn to spot possible offenders more quickly. This is often what we do, create a solution within a fixed pattern of relationships. In this type of abduction, the degree of innovation will be limited because the problem-solving process doesn't question the "how," and therefore excludes the creation of