Fred Cohen & Associates - Analyst Report and Newsletter

Welcome to our Analyst Report and Newsletter

The structure of risk and reward

Risk and reward are often couched as different things, but we really don't have a well understood view of risk and reward today. As a starting point, this month's article is dedicated to beginning to define a way to understand these issues.

What does the underlying space really look like?

At the end of the day, risk and reward can come by accident or intent, through natural events, or thought the artifice of human decision-making. The overall situation in the universe over time will be viewed by each individual as containing current and future and realizing current and past risks and rewards. Thus we can express the nature of risk and reward as the space over which all decisions of all artificial systems are made and acts undertaken along with the outcomes of all such decisions and natural phenomena. Thus the space of risk and reward is an unlimited dimensional space of situation over time with time variant situations a function of the combined acts of all of the unlimited participants, which join and leave the space through their birth and death. We will call this the RR space.

The totality of the RR space is unknown and unknowable by any individual as it contains all of the past and potential behaviors of everyone and everything. Each individual forms projections from the underlying space of risk and reward according to their own views of the space and outcomes of interest, and uses these projections to inform their decisions and judge their past performance. Thus each individual views each state of the space in their own way based on the projection they choose to use and the evaluation function they apply to their projection to measure outcomes as rewarding or punishing in the past and toward the future.

What do these projections look like?

Projections from the RR space look like anything the individuals making those projections choose to use. For example, some structured approaches frame everything in terms of a projection into a single fungible value – money as an example. Other projections view the space as consisting of defined dimensions, such as various ethical views. Game theoretical projections commonly view the space as a set of strategies and players with defined outcomes for moves by those players and divide the space into different game types and parameters for analytical purposes. Decision theorists often view projections of the RR space as mapping into different decision methods and modes based on various parameters of the decisions being made. Individuals often project decisions as the locations of factors in a space of importance and supportiveness. Competition and cooperation typically use different projections of the space.

The projections you choose lead to the decisions you make and the evaluation criteria you apply in making and reviewing those decisions. Identical situations and outcomes are present in the underlying RR space for everyone, but the projections of those outcomes into the spaces of the participants leads to dramatically different views and interpretations of the same overall situation. One person's reward may be another person's risk.

What are the units of risk and reward?

The units of the underlying space are the unlimited states of being for unlimited dimensional space of situations over time. In physics, this is generalized to an unlimited number of infinite dimensional Hilbert spaces, and as far as we are aware, no finite version of a definition of the space for decision-making has been formed yet.

On the other hand, each of the unlimited projections from the RR space has units defined by the method of projection. Thus in understanding the nature of risk and reward, it must be recognized that projections may not be and often are not commensurable. Even in a seemingly strictly competitive decision-making context, so-called win-win situations may arise when different objective functions are present for evaluation of situation.

The RR space and feedback

Projections, by their nature, make assumptions. Those assumptions, if understood or anticipated by others, may lead to advantages in strategic approaches to competition, or in other words, an alteration of the future states of the RR space for all participants. The understanding (or lack thereof) of assumptions is also a projection from the RR space to the space of the participants, and thus the overall RR space is a feedback system in which participants judge information and outcomes according to their projections and these projections in turn lead to limitations on the future RR space.

How does this help to better deal with the issues of risk and reward?

Understanding the nature of what you are dealing with is generally helpful to dealing with its limitations. Understanding the nature of the RR space and the units involved implies a wide range of things regarding measurement, reasonable expectations, and approaches to doing a better job of anticipating and constraining the future state of the RR space. And understanding leads to fewer surprises.

In the highly competitive environments of business, war, national security, and survival, a seemingly small advantage in understanding may lead to enormous differences in outcomes. By starting to understand the nature of risk and reward more clearly, the assumptions that linger for whatever methods you use in which ever contexts may be better understood. But it is a leap of faith, or perhaps a philosophical decision to conclude that knowing more you will do better.

Conclusions:

The real nature of the RR space is too complex to understand or work with directly. As a result, we use different and imprecise projections of the RR space for different purposes. The assumptions we make in our projections can be exploited, and result in changes to the future states of the space.

Whether you use decision theory, game theory, statistical methods, factors measuring import and support, or any other method, projection of the RR space into representations leads to limitations and exploitations that, if unrecognized, are likely to result in surprise.

As a philosophical point, we take the position that knowing more makes it more likely that you will do better at achieving your goals. As a practical matter, you will have to make your own decisions. After all, your projections of the RR space are up to you.