Ch 5. Kuhn and Normal Science  summarized by Inmyung Choi

REPUTATION OF SCIENTIFIC REVOLUTION AND PARADIGM

- The structure of scientific revolution was published in 1962 and made enormous impact on the world. The book influenced on not only science but also political or business world. We usually use the term ‘paradigm shift’ to explain some innovations.
- Despite his reputation, Khun spent his time to try to distance from some of the radical views of science. Logical empiricism was seriously damaged by Khun.

WHAT IS PARADIGM?

- As Khun admitted, he had used paradigm ambiguously. Two different senses of paradigm were used.
  (1) Broad sense: a package of ideas and methods make up both a view of world and a way of doing science.
  (2) Narrow sense: scientific achievement or examples that serve as models. Ex) Maxwell’s equation
  (3) When he wrote the book, he intended the narrow meaning.

DIFFERENCES BETWEEN KHUN AND OTHERS

- Popper emphasized the permanent openness of science but Khun disagreed to that idea.
- Popper believed that science proceeds via a single process. Khun said that science grows through the process of normal science, crisis science and revolutionary science.
- Logical empiricists made a sharp distinction between history and psychology of science. On the other hand, Kuhn was deliberately mixing together. This is why Khun was interpreted as a destroyer of logical empiricism.

NORMAL SCIENCE

- Normal science is work inspired by a striking achievement that provides a basis for further work (narrow sense of paradigm). Khun demonstrated this using Newton’s and Einstein’s paradigms.
- Two other examples
  (1) Psychology: in the middle of the twentieth century, a great deal of work was based on the behaviorist approach of B.F. Skinner. Learning is basically same in humans and animals. Human learning can be understood through experiments of animals. The Skinnerian paradigm includes a set of experimental tools and statistical techniques.
  (2) Biology: Modern molecular genetics is based on a set of principles such as
    ① genes are made of DNA
    ② genes have their effects by producing protein molecules and regulating other genes
    ③ nucleic acids specify the structure of proteins but not vice versa.
- In general, in Kuhn’s theory, one paradigm per field per time is the principle. A field is defined as an area of scientific investigation unified by a single paradigm. A great virtue of normal science is its organized, coordinated structure, a structure that results in precision and efficiency.
- In this period of normal science, there is no debate or disagree on the fundamentals. Most of the works done in normal science can be depicted as puzzle-solving. The normal scientist tries to use the tools and concepts provided by the paradigm to describe new phenomena. The term puzzle also seems to suggest that the work is in some way insignificant or trivial.

ANOMALY AND CRISIS

- According to Khun, the rejection of a paradigm happens only when (1) a critical mass of anomalies has arisen and (2) a rival paradigm has appeared. Crisis science is a special period when an existing paradigm has lost the ability to inspire and guide scientist. Critical mass of anomalies is needed to trigger for a crisis.
- Much of the secret of science is the remarkable balance it manages to strike between being too resistant to change in basic ideas, and not being resistant enough. If the simplest form of empiricist thinking prevailed, people would throw ideas away too quickly when unexpected observations appeared, and chaos would result.
DISCUSSION QUESTIONS

• Is the work of Kuhn descriptive or normative? Godfrey-Smith believes his work based on normative.

• If we are in a normal science, what is the example of paradigm? In IS discipline, Technology acceptance model (TAM) may be a good example. Lots of researchers have been followed the model and added several moderating variables to increase the explanatory power.

• In a Kuhn’s paper, the truth is social constructed belief? In a normal science, most of the scientists have a commitment to the paradigm. It seems like isomorphism used in institutional theory to explain the homogeneity in a field.