



Sloan Consulting

PRODUCTIVITY, QUALITY, INFORMATION AND BUSINESS SYSTEM SOLUTIONS

The Business Bookshelf

From The New Management Equation by M. Daniel Sloan, 1998 - 2005

The most serious productivity breakthrough students I have had the privilege of working with, express interest in business science history. In response, I created this chronological order bibliography. Those who choose to read the entire collection will be rewarded with insight. The 2500 year history of commerce is an interesting, useful, entertaining and thought evoking read.

1. Aristotle's books on Logic, Eudemian Ethics, and Politics are essential. These texts are the foundation for Six Sigma, Process Quality Improvement and Lean. They outline the sequential, Inductive/Deductive circular logic of applied science: Hypothesis, Experiment, and Test Hypothesis.

Aristotle's cycle is the foundation for all science including Sir Ronald Fisher's work and Walter Shewhart's original Plan, Do, Study, Act (PDSA) cycle.

Posterior Analytics proposes that the triangle signifies truth. *Eudemian Ethics* details the links between a respect for the individual, knowledge, the pursuit of happiness, virtue, and a good social order.

Since the vectors in a right triangle are the unifying concept for virtually all of Six Sigma's statistical tools, including the designed experiment and the standard deviation, σ , it is fair to credit Aristotle with a prescient understanding of business excellence in the 21st Century.

2. David Hume's *A Treatise of Human Understanding*, 1739, emphasizes the importance of sequential perceptions. In my opinion, Hume's ideas, writing, and thinking reflect contributions of English personality to applied science. Francis Bacon, Florence Nightingale, Newton, Darwin, Fisher, and Box are names that can be culturally linked to Hume's work.

3. *The Declaration of Independence*, 1776. This classic United States document addresses life, liberty, the pursuit of happiness, justice, and a good social order. Jefferson, Franklin, Washington, Adams, and other American revolutionaries were Hume's contemporaries. They communicated. The study of philosophy, science, and mathematics was an integral part of their lives.

Alexander Hamilton and Thomas Jefferson arrayed business statistics for the government. Their aim was to make the United States a competitive economic presence in global commerce.

4. Immanuel Kant's *Critique of Pure Reason*, 1781, tackles the complexity of quality. The circular logic of knowing, the quality of judgments, relationships, and modality are dealt with in one difficult, challenging text. Einstein specifically honored this work as an inspirational force in his work.

5. Albert Einstein's little book, *Relativity*, 1917. Einstein introduces the idea that "***the evolution of an empirical science is a continuous process of induction.***" Dr. Einstein's ideas on time, the sequential order of perceptions, measurement, and analysis are a landmark.

He specifically describes his use of probability, the Pythagorean Theorem, and the Cartesian (X, Y, Z) co-ordinate system. He provides a complete listing of applied science, applied business science thought leaders: Euclid, Galileo, Kepler, Descartes, Gauss, Hume, and Kant.

6. Ronald A. Fisher's works from 1913-1935. (A good resource for finding them is Collected Papers, Volumes 1-5 J.H. Bennet, Ed. The University of Adelaide, 1971-1974) The University of Washington's Math Library, and other endowed institutions, have his collected works available.

At age 25, Fisher's 1915 *Biometrika*, 10, paper entitled, "*Frequency Distribution of the Values of the Correlation Coefficient in Samples from an Indefinitely Large Population*" introduces the idea of using Cartesian coordinate system geometry to represent statistical samples. ***The Pythagorean Theorem applies to samples of any size!***

Fisher's 1921 *Metron* paper, "*On the Probable Error of a Coefficient of Correlation Deduced from a Small Sample*", explains the logarithmic transformation of the F ratio that leads to a near normal distribution. The complete table of correlation co-efficient, r , values and each one's corresponding z value is included.

Statistical Methods for Research Workers, 1924. This book details the practical application of a circular, inductive and deductive logic cycle. The thirteenth edition credits W. Edwards Deming for the extension of the Table of z to the 0.1 level.

The Design of Experiments, 1935, is a phenomenal, seminal work. "Inductive inference is the only process known to us by which essentially new knowledge comes into the world." The importance of experimental observations must be connected to the "precise, deductive reasoning" of Euclidean geometry.

7. Clarence Irving Lewis, *Mind and the World Order, Outline of a Theory of Knowledge*. 1929. This book inspired Walter Shewhart. The philosophy of conceptual pragmatism led to the development of the field of quality improvement as we know it.

8. Walter A. Shewhart's *Economic Control of Quality of Manufactured Product*, 1931. This book includes illustrations and ideas from Fisher's work and his own unique perspective on the importance of sequential data analysis.

Induction precedes deduction. It is interesting to note that Shewhart (a physicist and inventor of the quality control chart) offered to care for Fisher's children as World War II approached. The threat of Nazi U-boats prevented the planned trip from occurring.

"*The Nature and Origin of Standards of Quality*," was written in 1935 and was published in the January 1958 issue of *The Bell System Technical Journal*. He describes the character of the continuous improvement cycle as legislative, executive, and judicial.

Statistical Method from the Viewpoint of Quality Control, 1939, is taken from a series of US Agricultural Department lectures delivered at the invitation of W. Edwards Deming. Pages 44 and 45 contain the graphic illustration of a continuous improvement cycle: Hypothesis (**Legislative in nature**), Experiment (**Executive in character**), Test Hypothesis (**Judicial**).

Induction precedes deduction.

9. W. Edwards Deming's *Some Theory on Sampling*, 1950, is noteworthy. It was directly affected by Fisher and Shewhart's work. The first chapter addresses the primary importance of the design of an experiment. Deming details the geometry of sample variances on page 62. It provides an interesting platform for evaluating two of his most important business science papers and his best-selling book.

On the Distinction between Enumerative and Analytic Surveys, *The American Statistical Association Journal*, June 1953, comes directly from *Some Theory on Sampling*. This article shows the futility of using random samples for analyzing a dynamic process.

On a Classification of the Problems of Statistical Inference, June 1942, Number 218, Volume 37, gives his vision of a quality controlled health care system.

Out of the Crisis, 1986. Here are fourteen points for a good social order in the workplace to ponder. His PDCA improvement cycle dates to Aristotle. Deming cites the influence of Shewhart, Clarence Irving Lewis, and Fisher. It is curious to note that Deming's 1951 understanding of the importance of a designed experiment and the economy/ geometry of sample, are absent from this work. The book rambles; it is a difficult read.

10. Ludwig von Bertalanffy's *General System Theory*, 1968. This is a best-of- class book on systems thinking.

11. George Box, William G. Hunter, and J. Stuart Hunter, *Statistics for Experimenters, An Introduction to Design, Data Analysis, and Model Building*, 1978. This is a master work of applied science. The pictures R.A. Fisher imagined are drawn. Many of the important algebraic expressions Fisher wrote are translated. Somehow Fisher's ideas are simplified. Induction precedes deduction.

One of the book's essential main points, Fisher's main point, is hidden from view and needs to be illuminated; Pythagoras's Theorem provides sound theory for *all* statistical theory. The angle of error, θ , between the observation vector c and the average observed value vector a equals the variance b in a right triangle. This angle explains the *family of distributions* t , F , χ^2 and z statistics, all control chart limits, and the correlation coefficient r .

12. Steve deShazer's *Clues: Investigating Solutions in Brief Therapy*, 1988, is the only therapy model and/or psychological theory I know that was developed using probability theory, inductive reasoning, and flow diagrams.

This model for rapid improvement works well in systems of any size. Mr. deShazer formally opposes a focus on defects, defectives, and problems. Rather one should focus on solutions and doing more of what works.

