
A New Application for Systems Engineering: The Science of Laws

John N. Wood, PhD

Science of Laws Institute
14341 Horizon Ct.
Poway, CA 92064
john.wood@scienceoflaws.org

David G. Schrunk, MD

Science of Laws Institute
14341 Horizon Ct.
Poway, CA 92064
david.schrunk@scienceoflaws.org

Abstract

The laws of government, such as statutes, regulations, and ordinances, are the means by which the problem-solving goals of government are attained. Unfortunately, the traditional method of lawmaking is seriously flawed. As a result, societal problems (including crime, poverty, and financial instability) remain largely unsolved, and governments thus fail to satisfy their public benefit purpose. A solution to this problem has been proposed: expand science to encompass laws and the lawmaking process. All established fields of science are successful as measured by the continuous accumulation of reliable (scientific) knowledge and by ongoing technological advances (engineering). Since laws are human-made tools that produce a measurable impact on the physical universe, they are eminently suited for incorporation into the realm of science and engineering. Further, as the design of laws must balance a plethora of distinct and sometimes conflicting needs from a variety of fields (e.g., economics, business, sociology, statistics, human factors, political science, civil engineering, etc.), the practice is well suited for the domain of systems engineering. The purpose of this paper is to discuss the concept of the science of laws as it relates to the field of systems engineering, the current status of the science of laws, and the anticipated future needs and developments of this emerging field of study.

Author Keywords

Science of Laws; Lawmaking; Government; Systems Engineering

Introduction

The laws of government, such as statutes, regulations, and ordinances, are the means, or tools, by which the problem-solving goals of government are attained. However, unlike all other productive industries that make useful products, the lawmaking industry has not been successful. Despite the continuous production of large numbers of laws at all levels of government and the resulting expenditure of substantial resources and efforts, societal problems such as war, crime, poverty, and financial instability remain as serious challenges for governments [1]. As legislatures continue to create more laws, the size, cost, and complexity of the bodies of laws increase but societal problems remain mostly unsolved, and governments thus fail to satisfy their public benefit purpose. Also, as the size of the bodies of laws increases, governments resort to the selective enforcement of laws in violation of the rule of law.

The crux of the problem of the failure of laws is the method by which they are created: the traditional method of lawmaking, which is dialectic and based on rhetoric. A study of the traditional method [1] revealed that it is seriously flawed and is not, in fact, a problem solving process. It does not address defined problems, state goals, adequately account for costs or risks, or have a basis in reliable knowledge. Furthermore, it does not measure outcomes and is therefore unable to identify failed and harmful laws so they can be removed (repealed).

A solution to the problem of the failure of the laws of government has been proposed [1, 2]: expand science to encompass laws and the lawmaking process. The fields of science (to include engineering) are all successful as measured by the continuous accumulation of reliable (scientific) knowledge and by ongoing technological (engineering) advances. Since laws are human-made tools that produce a measurable impact on the physical universe, they are eminently suited for incorporation into the realm of science. The purpose of this paper is to discuss the concept of the science of laws as it relates to the field of systems engineering, the current status of the science of laws, and the anticipated future needs and developments of this emerging field of study.

Science of Laws Concept

The science of laws was formally organized as science with the establishment of the Science of Laws Institute (a non-profit research institution) in 1995 [2]. The purpose of the Institute is to foster the growth of the science of laws. The science of laws consists of two coequal branches [1, 2]: 1) The creative science (i.e., engineering) of laws and 2) The investigative science of laws. The purpose of the creative branch of the science of laws is to solve the societal problems that degrade or threaten the well-being of the people in terms of their human rights, living standards, or quality of life. To accomplish this task, it employs knowledge, tools, and engineering design expertise, such as modeling and simulation, to create and optimize laws of government. It also derives, records, organizes, and promulgates reliable knowledge relating to design methodologies and best practices that are applicable to the creation of laws of government. The creative science of laws will correct the defects of the traditional method, establish

quality design (QD) standards, quality improvement (QI) standards, and ethical standards for the creation and optimization of laws. These efforts will thus transform lawmaking into a knowledge industry. Eventually, the creative science of laws will supplant the law-making (but not the policy-making) task of legislatures.

The competent design of laws will require inputs from experts in many fields of expertise such as economics, business, sociology, law, statistics, human factors, political science, and software, civil, and computer engineering; it will constitute the ultimate exercise in multi-disciplinary engineering. Since a government's body of laws is a complex and dynamically interacting system of law-elements, the effective, cost-efficient, and safe operation of that system will primarily be a systems engineering challenge. For this reason, the creative science of laws is considered to come under the auspices of the field of systems engineering.

The purpose of the investigative science of laws is to derive, record, organize, and promulgate scientific knowledge of the structure and mechanics (cause and effect mechanisms) of the laws of government. Every law of government is created on the universally-held premise that the law, when enforced, will produce a desired change of human behavior. A law of government is thus an experiment of human behavior based upon the hypothesis that the law, when enforced, will produce a beneficial societal outcome. However, this experiment is currently incomplete because governments do not routinely measure, analyze, and record the outcomes of law enforcement. The result of the lack of follow-up evaluation of laws is that the effects of laws are unknown and some laws

that may, in fact, be harmful to the public remain in force. To end ignorance of the outcomes of laws, the investigative science of laws uses scientific methodologies to derive and accumulate reliable knowledge of the structure and mechanics of laws as well as their observed effects. With this knowledge, governments can establish quality assurance (QA) programs that identify, and thus lead to the repeal of, those laws that cannot be demonstrated to provide a net benefit to the public. In addition, the accumulated knowledge of the outcomes, or history, of laws will enable governments to avoid the mistakes of previous failed laws, and will serve as a useful database for the creation of new laws.

Current Status

The Science of Laws Institute conducted a survey of abstracts of studies investigating the cause and effect mechanisms of laws that had been reported in the scientific literature from the eighteenth century to the year 2006. This database of abstracts has been published on the website of the Institute [2] and represents the beginning of the body of scientific knowledge that is specific to the mechanics of laws. In 2014, the Institute established the Journal of the Science of Laws and posted the Journal on the website of the Institute [2]. The purpose of the Journal is to publish peer-reviewed scientific reports that are relevant to the science and engineering disciplines of laws. In November, 2014, the Institute sponsored the First Annual Science of Laws Conference at the University of California in San Diego in conjunction with the San Diego branch of INCOSE. Four peer-reviewed papers from that meeting were published in the Journal at the website of the Institute. In November, 2015, the Institute sponsored the Second Annual Science of Laws

Conference, also in conjunction with the San Diego branch of INCOSE. Five peer-reviewed papers from that conference are slated to be published in an upcoming issue of the Journal.

Recommendations for Future Development

The Institute will continue its annual conference and continue publishing issues of the Journal. It will also update and expand the database of scientific articles to include reports on investigative methodologies relevant to outcomes research of laws and reports on design methodologies that are relevant to the creation of laws. It will establish links with other science and engineering institutions to exchange information and coordinate efforts to improve the knowledge of laws and to improve the efficacy of laws. Finally, it plans to work with universities to develop multi-disciplinary educational curricula for college degrees up to the PhD level for future practitioners of the science and engineering disciplines of laws.

Conclusion

The goal of the science of laws is to improve the performance of governments through the expansion of science to encompass laws and lawmaking. Based on the proven successes of science, it is predictable that

the science and engineering disciplines of laws will not only correct the failures of the existing bodies of laws of government and the lawmaking process but will also achieve the same levels of success (as measured by the solution of societal problems in the best interests of the public) that now characterize all other fields of science. The synergism between legislatures and the science of laws may be expected to produce the favorable scenario where, at any given point in time, societal problems are being solved by ever-improving means while problems of the next higher order of complexity are in the process of being solved. In other words, the further development of the science of laws, which is primarily a systems engineering discipline, will enable governments to satisfy their public benefit obligations through the operation of a body of laws that has been created, maintained, and optimized by the science of laws.

References

- [1] Schrank, D.G., *THE END OF CHAOS: Quality Laws and the Ascendancy of Democracy*. QL Press, Poway, CA, 2005.
- [2] Science of Laws Institute.
www.scienceoflawsinstitute.org