

# **Competition and Cooperation in Societal and Technological Systems of Systems**

A Presentation by

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## **ABSTRACT**

An encompassing perspective on competition and cooperation is presented for multiple participants strategically interacting within societal and technological systems of systems according to their underlying value systems as they strive to reach their goals. By appreciating the reality that systems of systems are inhabited by multiple participants or agents having multiple objectives, one can adhere to adaptive and integrative decision making principles to properly design, construct, maintain, and operate systems of systems that serve the interests of stakeholders in a fair and sustainable manner throughout the systems' life cycles. An insightful way is explained for classifying systems of systems in the world according to environmental (natural world), societal (real life), intelligent (artificial life) and integrated (mixed life) systems of systems. To examine strategic behaviour in societal systems of systems, some of the latest contributions in systems thinking techniques are discussed for advancing the paradigm of the Graph Model for Conflict Resolution including modeling value systems, taking preference uncertainty and strength of preference into account, describing how emotions can affect decision making under conflict, and tracing the evolution of a conflict from a status quo situation to a final equilibrium. A real world environmental conflict is employed to illustrate how cooperation among decision makers can produce a more preferred win/win resolution which cannot be reached when they behave independently in a purely competitive manner. In fact, tremendous opportunities abound for researchers and practitioners in systems, man and cybernetics to develop flexible smart systems tools in multiple participant-multiple objective decision making for both cooperative and independent interactive situations to tackle pressing global problems such as global warming, unemployment, globalization of trade, over-population, widespread pollution, poverty,

terrorism, and proliferation of nuclear weapons, from a multidisciplinary viewpoint. Moreover, it is pointed out that universal multiple participant decision making techniques need to be developed or significantly expanded and improved for employment in many diverse kinds of systems of systems such that multi-agents' value systems and protocols governing competitive and cooperative behaviour among agents are based upon ethical principles such as the prioritization of societal well-being, social justice, environmental protection, and sustainable development. As exemplified by the devastating tsunami of December 26, 2004 in Southern Asia, created by the undersea Sumatra-Andaman earthquake, in which more than 230,000 people died, adaptive and integrative policy and governance systems are required such that decisions can be made in real time based upon enormous amounts of data being collected over widespread areas so that appropriate remedial actions, such as large-scale evacuations of people in low-lying coastal areas, can be immediately implemented.

### **SOURCE**

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