Herbert Alexander Simon

(June 15, 1916 – February 9, 2001)

"What information consumes is rather obvious: it consumes the attention of its recipients. Hence, a wealth of information creates a poverty of attention and a need to allocate that attention efficiently among the overabundance of information sources that might consume it.

Introduction

Herbert Simon is recognized as one of the founding fathers of important scientific domains and the most renowned figure of the twentieth century. Apart from being the key researcher in the field of science, he is also recognized as an economist, a professor, a sociologist and a psychologist. His works contributed to the field of management literature, economics, cognitive psychology and artificial intelligence. He worked as a professor for 52 years at Carnegie Mellon.

Contributions in the field of Economics

Decision-making was the core of Simon's work. It was the heart of his dissertation, later published as *Administrative Behavior,* and it became the basis of his other contributions to organization theory, economics, psychology, and computer science. The centerpiece of this book is the behavioral and cognitive processes of making rational human choices, that is, decisions. An operational administrative decision should be correct and efficient, and it must be practical to implement with a set of coordinated means. The task of decision-making is to select the alternative results in the more preferred set of all the possible consequences.

According to Simon, the decision-making process consists of three main stages:

1. Intelligence: Fact finding, problem and opportunity sensing, analysis, and exploration.
2. Design: Formulation of solutions, generation of alternatives, modeling and simulation.
3. Choice: Goal maximization, alternative selection, decision making, and implementation.

Satisficing: To satisfice', which denotes the situation where people seek solutions or accept choices or judgments that are 'good enough' for their purposes, but could be optimized.

Bounded rationality: Simon proposed that humans are limited in their rationality due to at least three factors.

1. Rationality requires complete knowledge and understanding of the consequences of a given action.
2. Given that consequences of actions, per definition, will emerge in the future, it is difficult for decision-makers to fully evaluate the future worth of their decisions.
3. Rationality requires that all alternative actions are known.

The ideas of bounded rationality and satisficing became important for his subsequent developments in economics.

Hawkins-Simon theorem
Simon with David Hawkins came up with the Hawkins-Simon theorem on the conditions for the existence of positive solution vectors for input-output matrices.

Contributions to Artificial Intelligence

Simon was one of the first ones to explore the realms of artificial intelligence, and together with Allen Newell came up with the Logic Theory Machine (1956) and the General Problem Solver (GPS) (1957) programs. GPS is believed to be the first method of distinguishing problem solving scheme from information about particular issues. Apart from this, Simon wanted to know how humans learn and with Edward Feigenbaum he formulated the Elementary Perceiver and Memorizer theory — one of the first theories of learning as a computer program.

Important work - The Sciences of the Artificial

This book is published in 1969 and is the most influential book in the field of artificial intelligence. In this book he characterized an artifact as an interface between an "'inner' environment, the substance and organization of the artifact itself, and an 'outer' environment, the surroundings in which it operates. Through the argument of thoughts and memory, Simon asserts psychology is also a science of the artificial. Moreover, Simon provides an outline curriculum for a course in "the science of design", where asserts that design "is the principal work that distinguishes the professions from the sciences"- and he includes architecture, business, education, law and medicine as professions. Toward the end of the book, Simon claims that complexity is a general property of systems that are made of different parts and that the emergent behavior is hard to characterize. In general, he asserts that a general theory of complex systems must refer to a theory of hierarchy. And the near decomposability property simplifies both the behavior of a complex system and its description.

Related Thinkers

- **Mark S. Ackerman:** Computer Supported Cooperative Work (CSCW)
  - Engineering discipline + social science
- **Edwin Hutchins:** Distributed Cognition
  - *Cognition in the Wild*: Cognitive systems involving multiple agents and the material world

References

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