

# Architecture Approach for Managing System Complexity Using System Dynamics

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**Abstract** Complex systems are defined by their behavior such as being adaptive, non-linear, or emergent. According to System Dynamics, the behavior and capabilities of a complex system are based on the dynamics of the underlying system structures. The interaction (information exchanges) among the various underlying structures, the feedback among them and the information processing delays involved along those interactions determine thus the system behavior. Accordingly, changes in the system structure impact its complex behavior and changes in system behavior requires changes to the underlying structures. The current approach argues that capturing the dependency between structural changes and system behavior can enable a better system design and management. That is, managing the structural complexity of a system (managing the number of elements used, their variety and level of dependency) can enable a better management of the system complex behavior. Introducing an additional architecture view to the system design that captures system structural complexity enables the depiction of the behavioral-structural dependency and a better evaluation of different system designs and management approaches from a structural complexity perspective.

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