SYSTEMS ENGINEERING RESEARCH CENTER

8TH ANNUAL SERC DOCTORAL STUDENTS FORUM
12TH ANNUAL SERC SPONSOR RESEARCH REVIEW
HOSTED VIRTUALLY ON : NOVEMBER 17-18, 2020

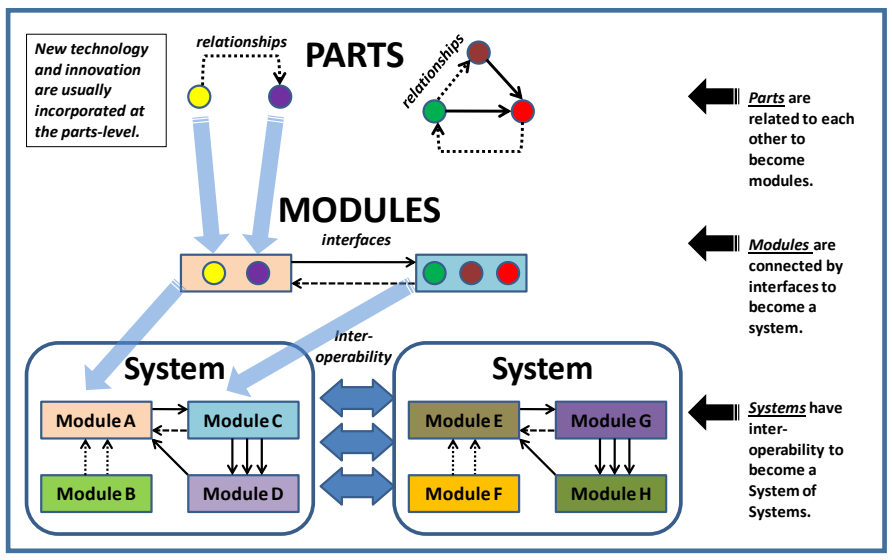
STEVENS INSTITUTE of TECHNOLOGY
THE INNOVATION UNIVERSITY

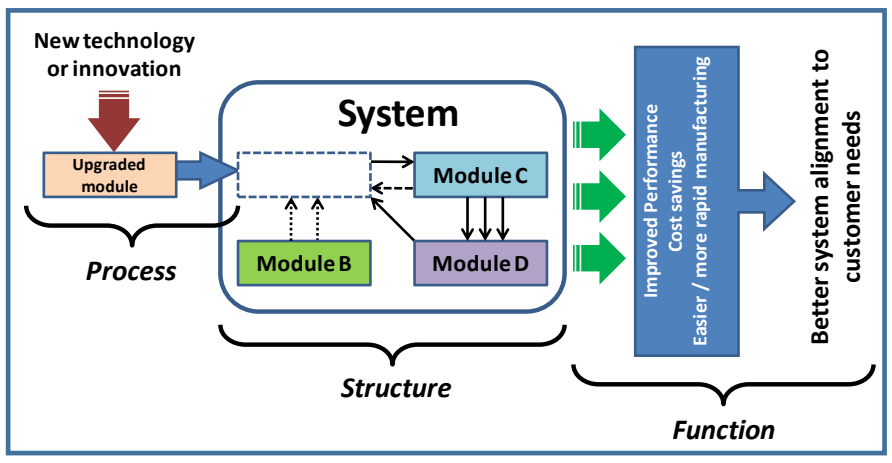
A Systems Engineering Approach to the Incorporation of New Technologies and Innovations in Modular System Upgrades

RESEARCH TASK / OVERVIEW

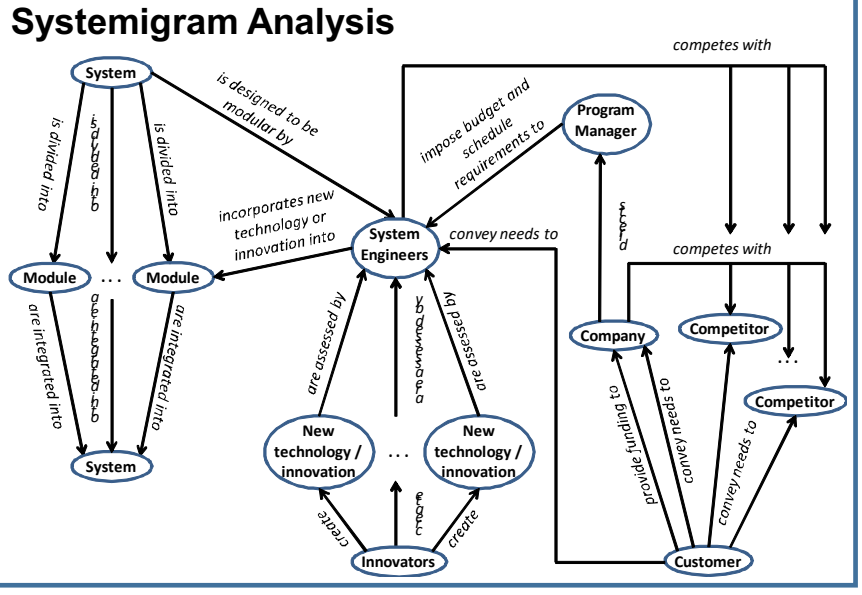
- Modular systems are upgraded through the incorporation of new technologies or innovations
- It is a complex process that involves many stakeholders with varying interests
- The systems thinking concepts of stakeholder, shaping forces, conceptigan, and systemigram analyses are used
- Optimization techniques are explored to see what is the best way to upgrade

DATA & ANALYSIS

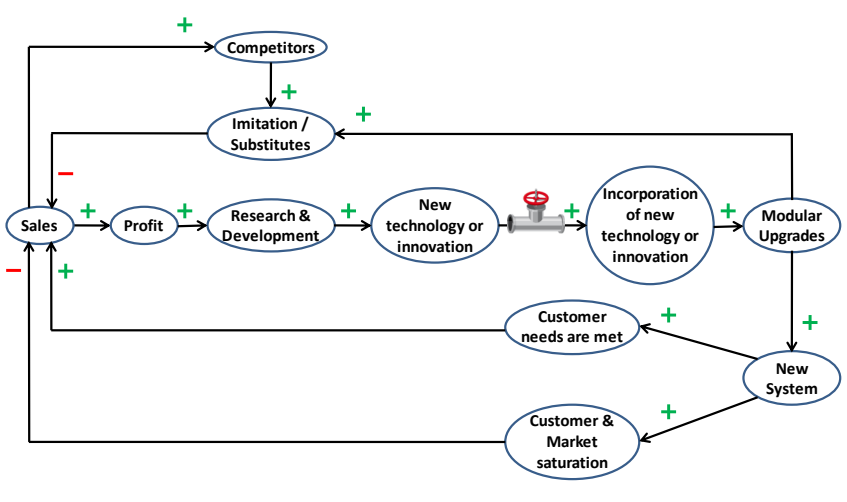




Systemigram Analysis

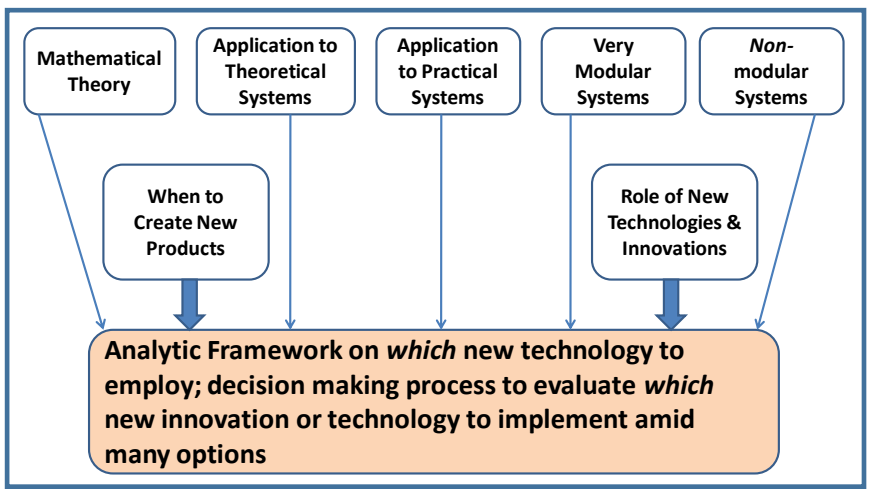


Causal Loop Analysis



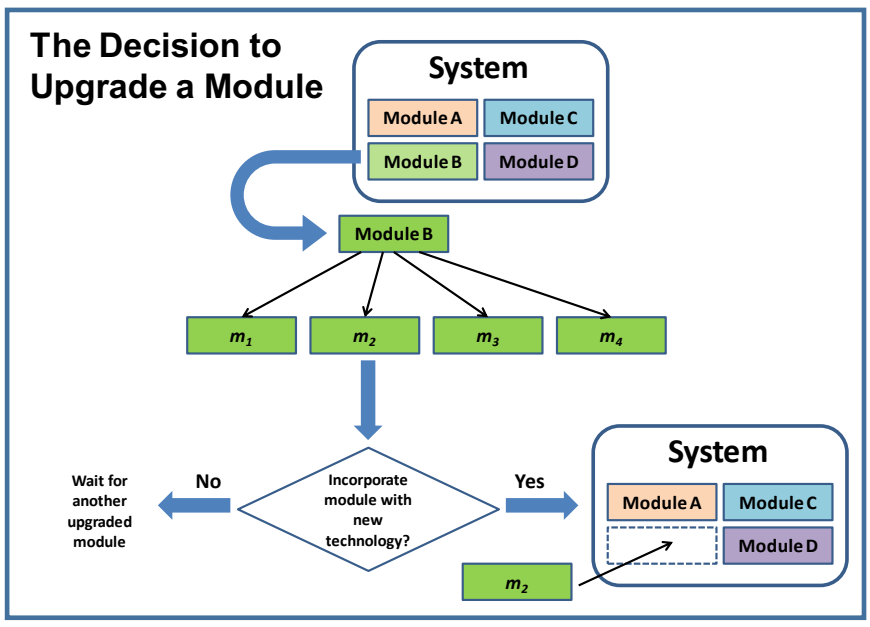
GOALS & OBJECTIVES

Goal is to better understand the underlying processes, transformations, and relationships that drive the decision to upgrade a module within a modular system

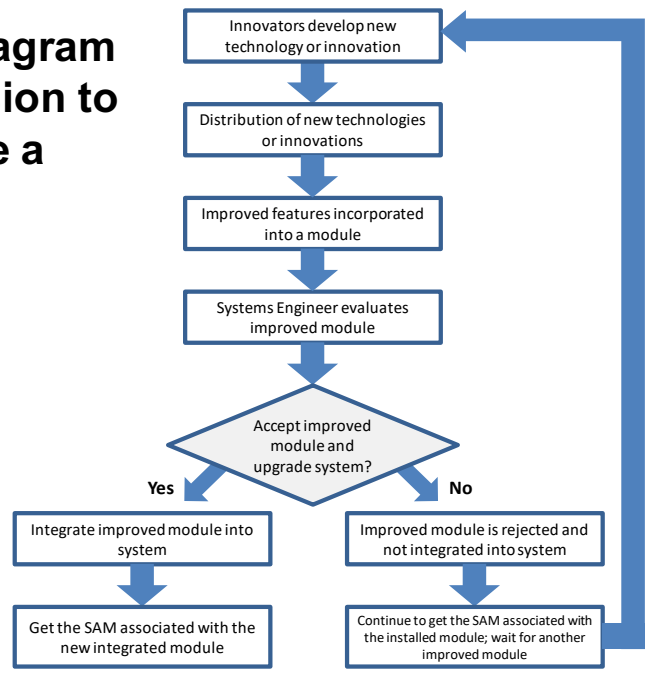


METHODOLOGY

The Decision to Upgrade a Module



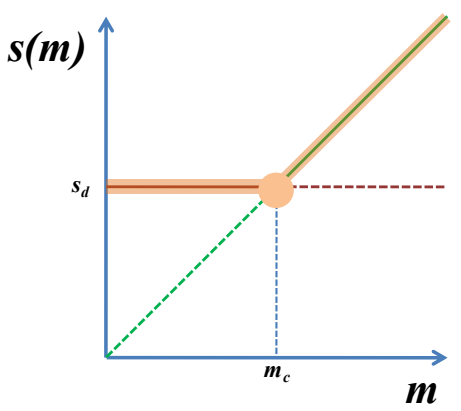
Flow Diagram of Decision to Upgrade a Module



FUTURE RESEARCH

The optimization strategy is the maximum of the "no upgrades" and "always upgrade" system performances.

The m_c value must be used by the Systems Engineer when deciding to upgrade a modular system.



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