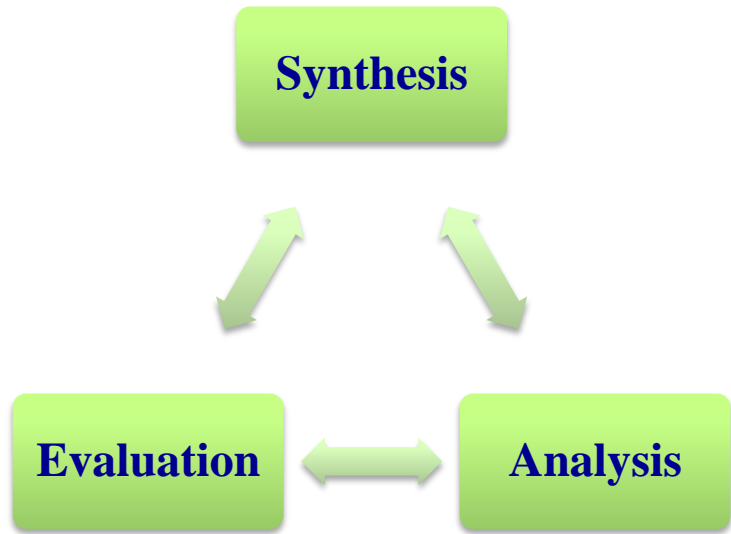# Systems Thinking – Creativity and Innovation (Individual and Team)

- **Focus on the outside before focusing on the inside**

- **Outside focus includes:**
  - Understanding the stakeholders (business, technology, organizational, political)
  - Understanding the environment and the system context
  - Understanding key drivers and constraints, including historical and legacy constraints; mission and opportunity constraints, inclusive of cost and schedule

- **Decoupling the problem space from the solution space – while hopping back and forth between them**

- **Thinking verbs not nouns**

Synthesis

Evaluation   **Analysis**

Innovation and creativity are essential pre-requisites, as is domain knowledge

A lawnmower and an issue in the field…

Systems Thinking:
Army EOD Robot Example

Overcomplicating the problem

The Simple Solution

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I believe that if you are trying to **build something of beauty**, something that will **create a beautiful experience**, you **start with validation**, *not verification*.

To be successful, I believe that you need to iteratively work through a validation process with rapidly developed prototypes.

Once you have something that captures the essence of the experience that you want to create, then you create the requirements that make it possible.

I believe that the walkman started with a block of wood of a certain size and Akio Morita told the engineers to make the functions he described fit.

Someone from the government came to Dean Kamen and asked him to make a prosthetic arm that could pick up a grape without damaging it, could fill a cup of coffee and bring it to the user's mouth safely to drink, could run a day on a charge and weighed less than 15 pounds. (About a year later a prototype was demonstrated.)

Starting with a long list of requirements almost ensures that no one really understands the essence of what you are trying to achieve.

Also, you need someone who has a vision for what THE customer experience should be, has a fanatical attention to detail and excellence, wants to create insanely great products and has the **authority to make decisions**. Toyota called this person a **Chief Engineer**, Sun called this person a **Product Boss**, and Apple calls him **Steve Jobs**. There is simply no substitute for someone with the right vision.
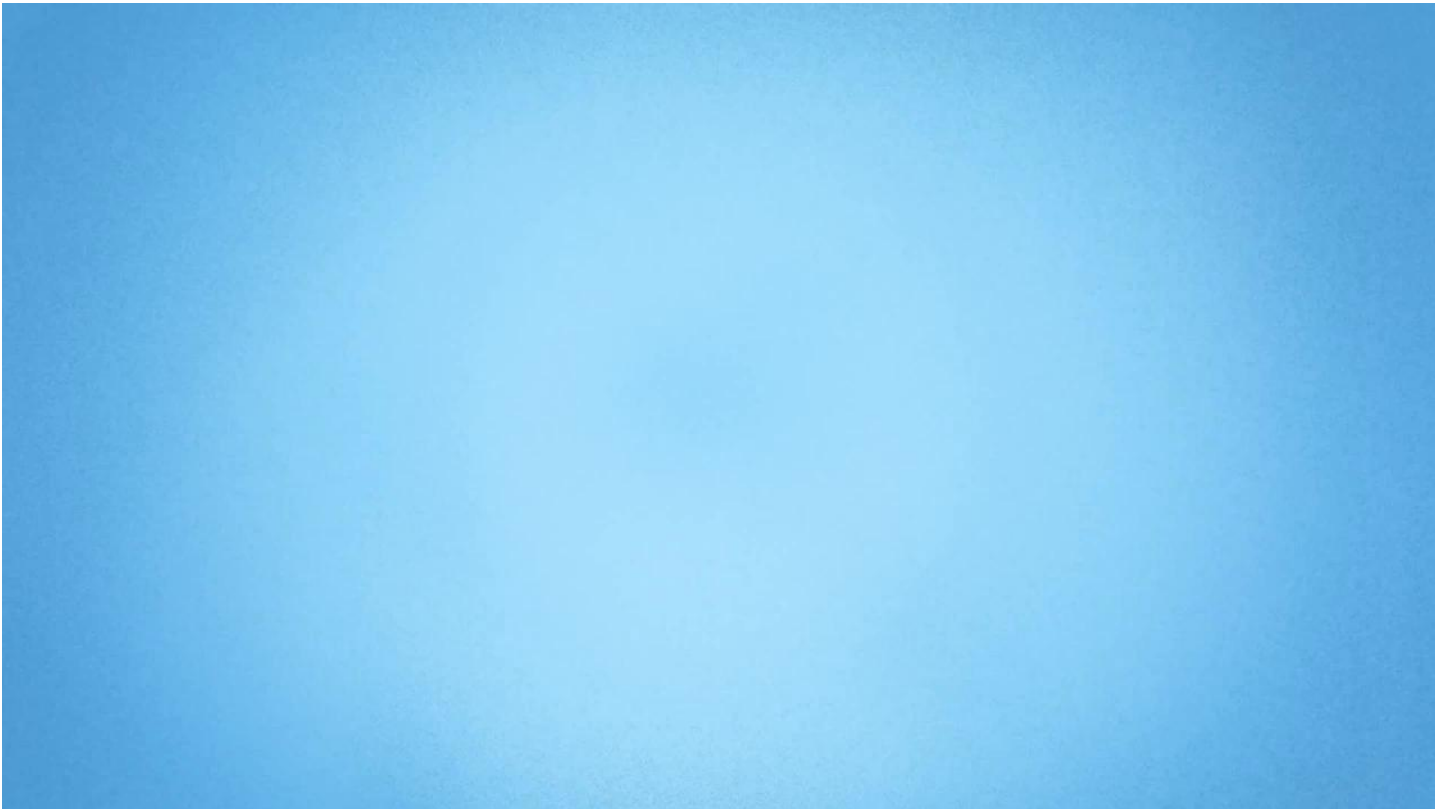
TRLs to SRLs

Technical Leadership

System Aware Security

Difference in Business Models

Pull for the Solution versus Push the Solution

Risk Tolerance – and the issue of culture…