

Advise for Researchers “on the frontiers between Management Science and Engineering”

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Advice for Researchers

1. Work on important problems

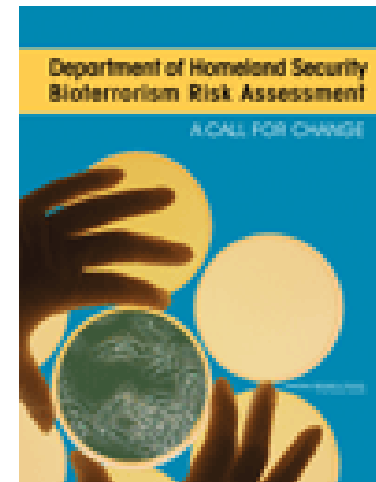
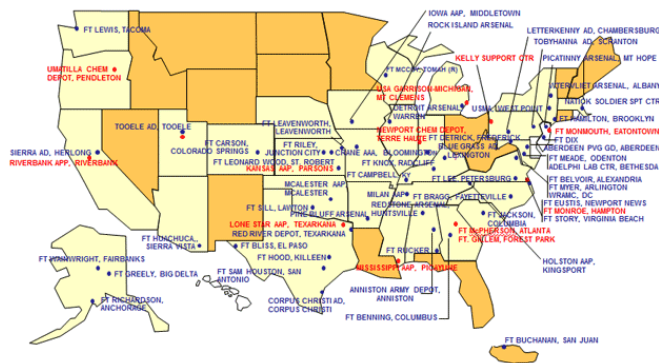


1. Work on important problems

“Don’t undertake a project unless it is manifestly important and nearly impossible” Edwin Land



Air Force 2025 (1995)



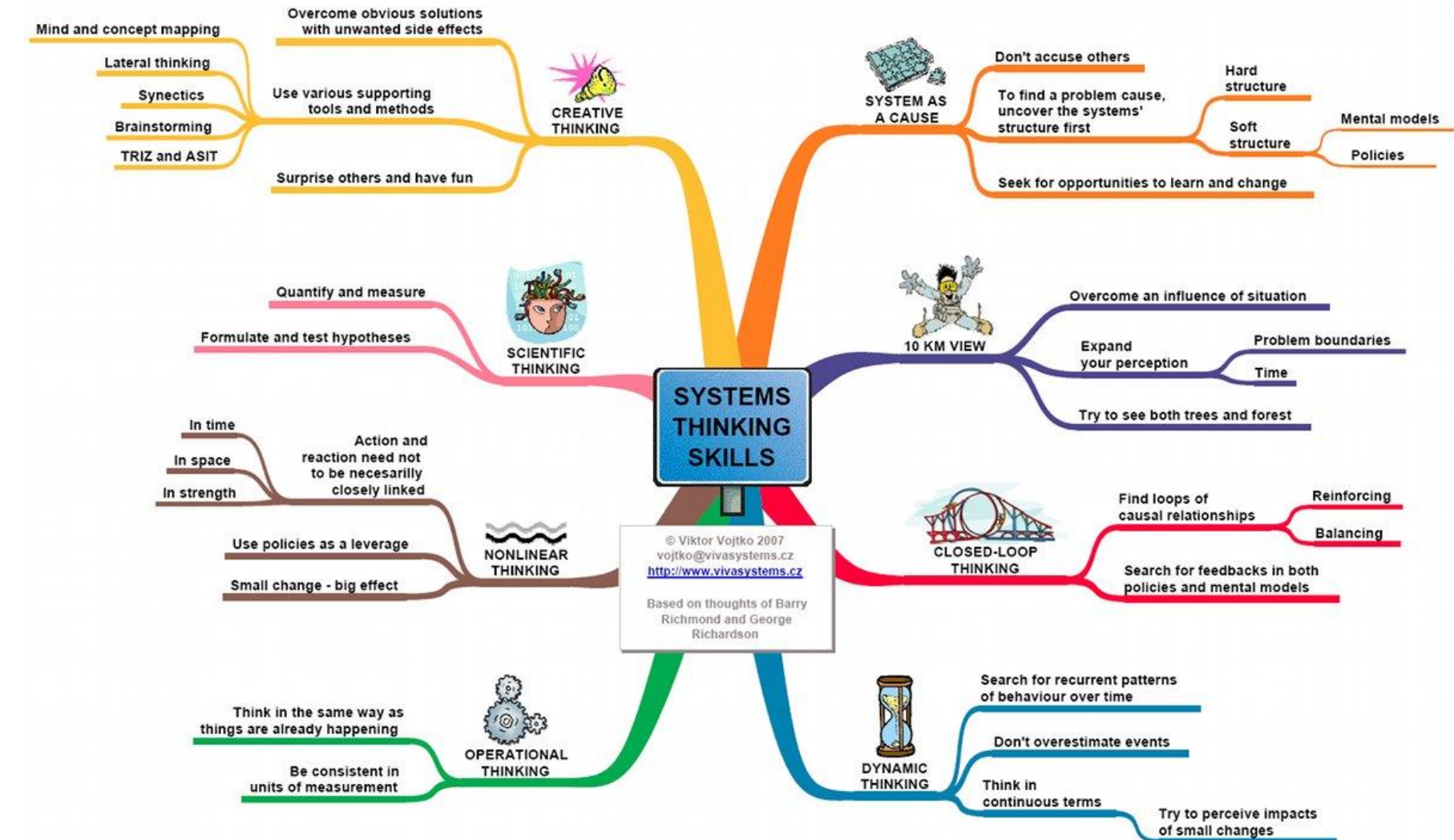


Advice for Researchers

1. Work on important problems
2. Use systems thinking



2. Use systems thinking (conceptual)

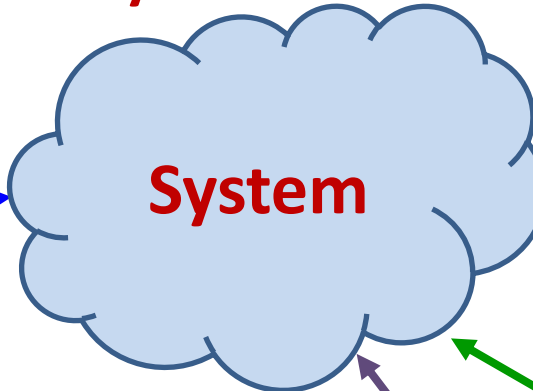


2. Use systems thinking (engineering)

Boundary

**Purpose: What the
system does.**

**Functions
(verb object)**



State

* Transient

* Steady State

Structure

* Super-system

* Lateral Systems

* Sub-System

Inputs Outputs



Derive

Requirements

Allocate to

Components

* Structural

* Operating

* Flow

Future

• Resilience

• Flexibility



Advice for Researchers

1. Work on important problems
2. Use systems thinking
- 3. Work with creative people**

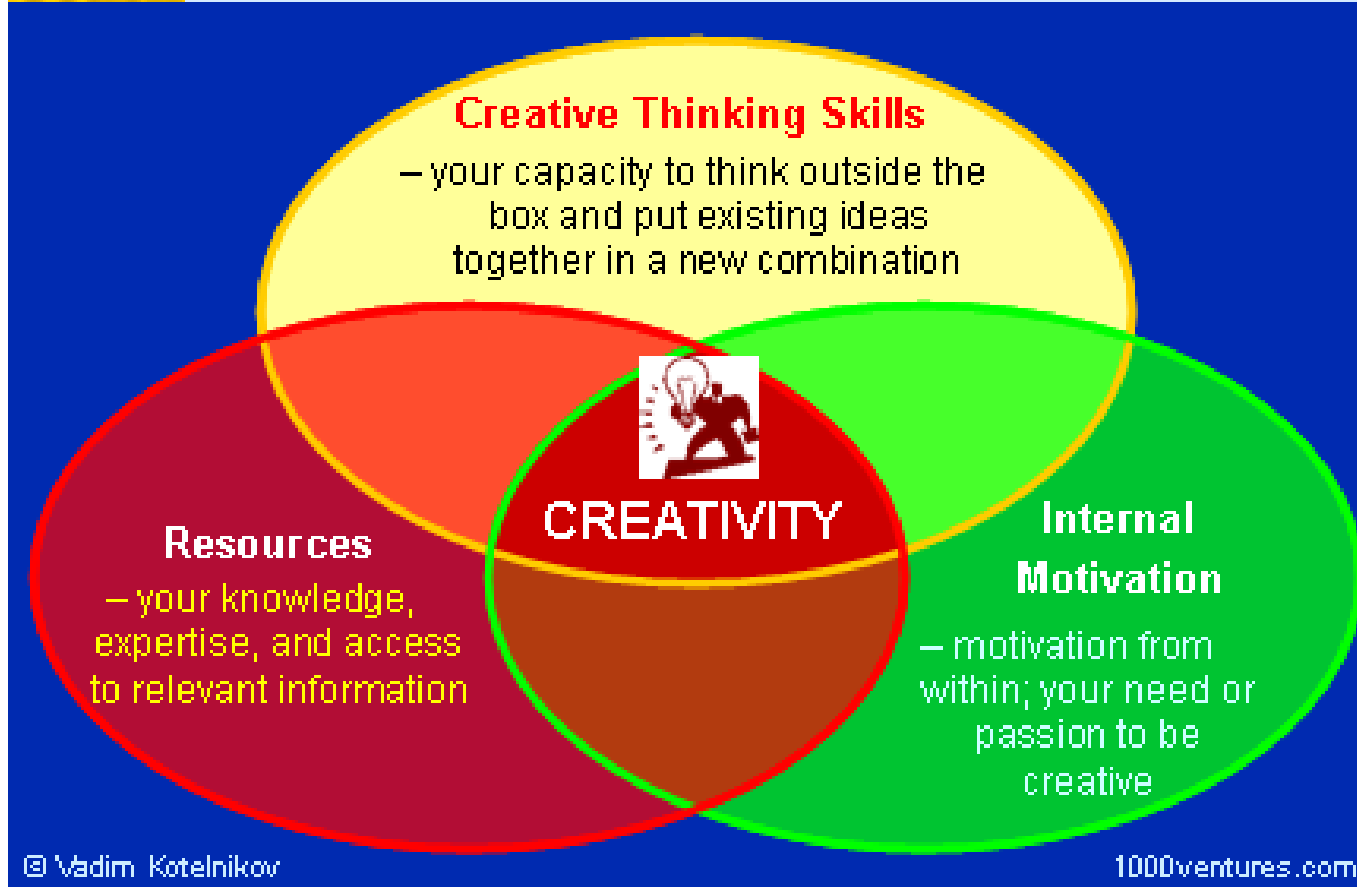


3. Work with creative people.



Creativity in Individuals

A Function of Resources, Motivation, & Creative Thinking



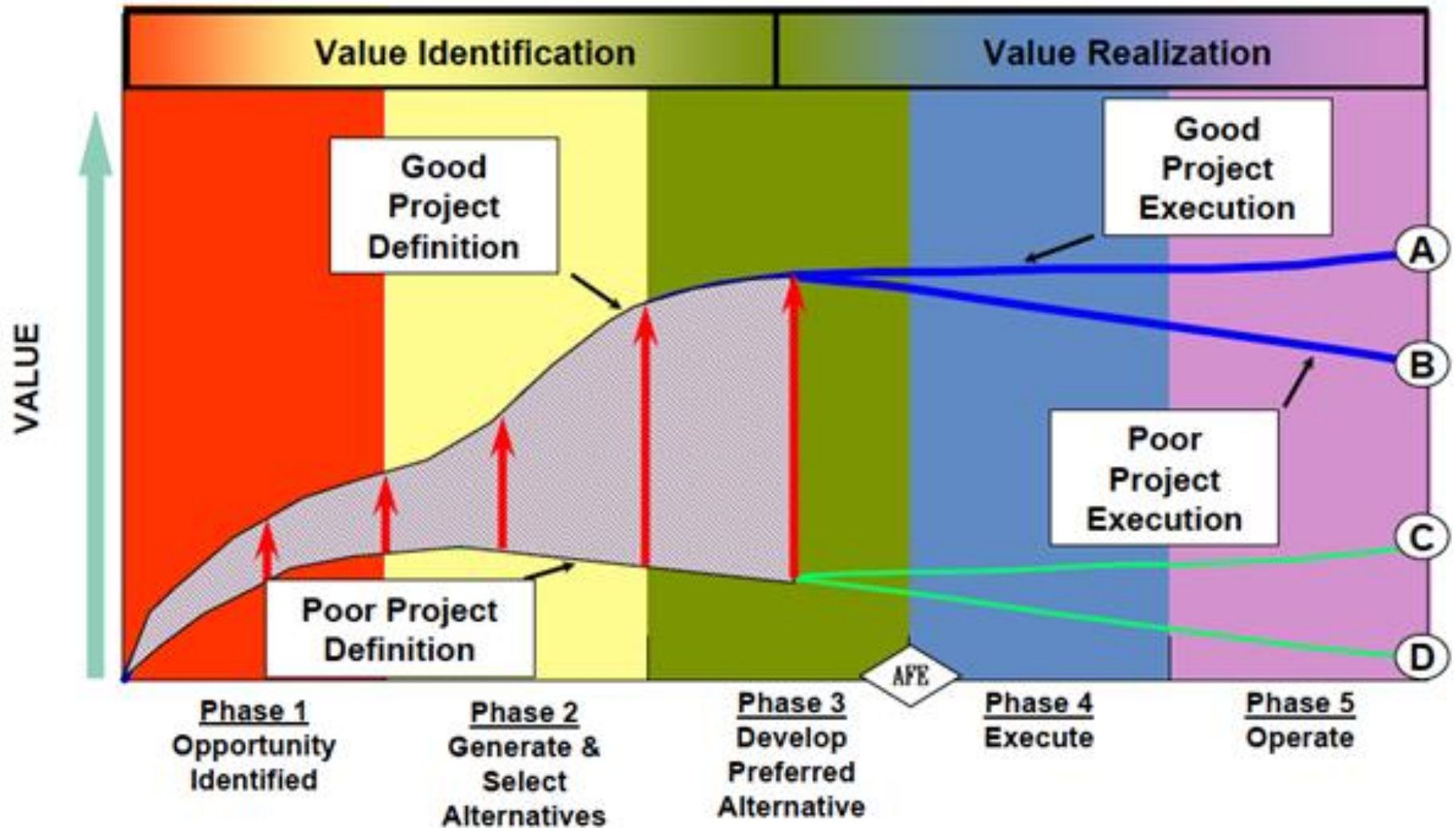


Advice for Researchers

1. Work on important problems
2. Use systems thinking
3. Work with creative people
- 4. Creatively define the opportunity**



4. Creatively define the opportunity (Chevron's Eagle's Beak Chart)





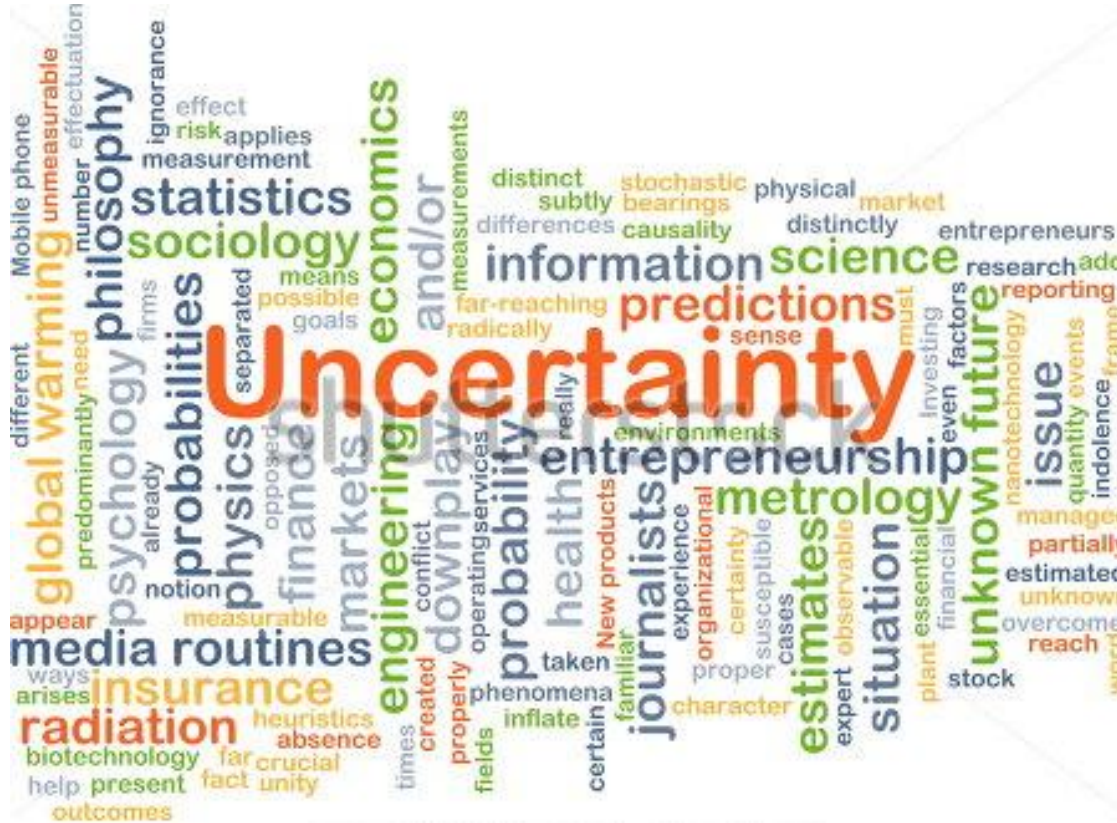
Advice for Researchers

1. Work on important problems
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4. Creatively define the opportunity
- 5. Think about uncertainty**

5. Think about Uncertainty

Prediction is very difficult, especially about the future.

Niels Bohr



Probability and scenario analysis can be very effective.



Probability Management

<http://probabilitymanagement.org/>



Advice for Researchers

1. Work on important problems
2. Use systems thinking
3. Work with creative people
4. Creatively define the opportunity
5. Think about uncertainty
- 6. Learn to communicate**



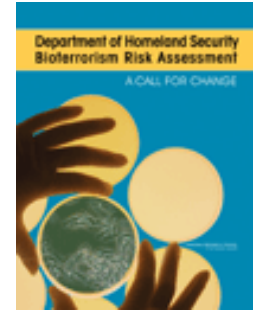
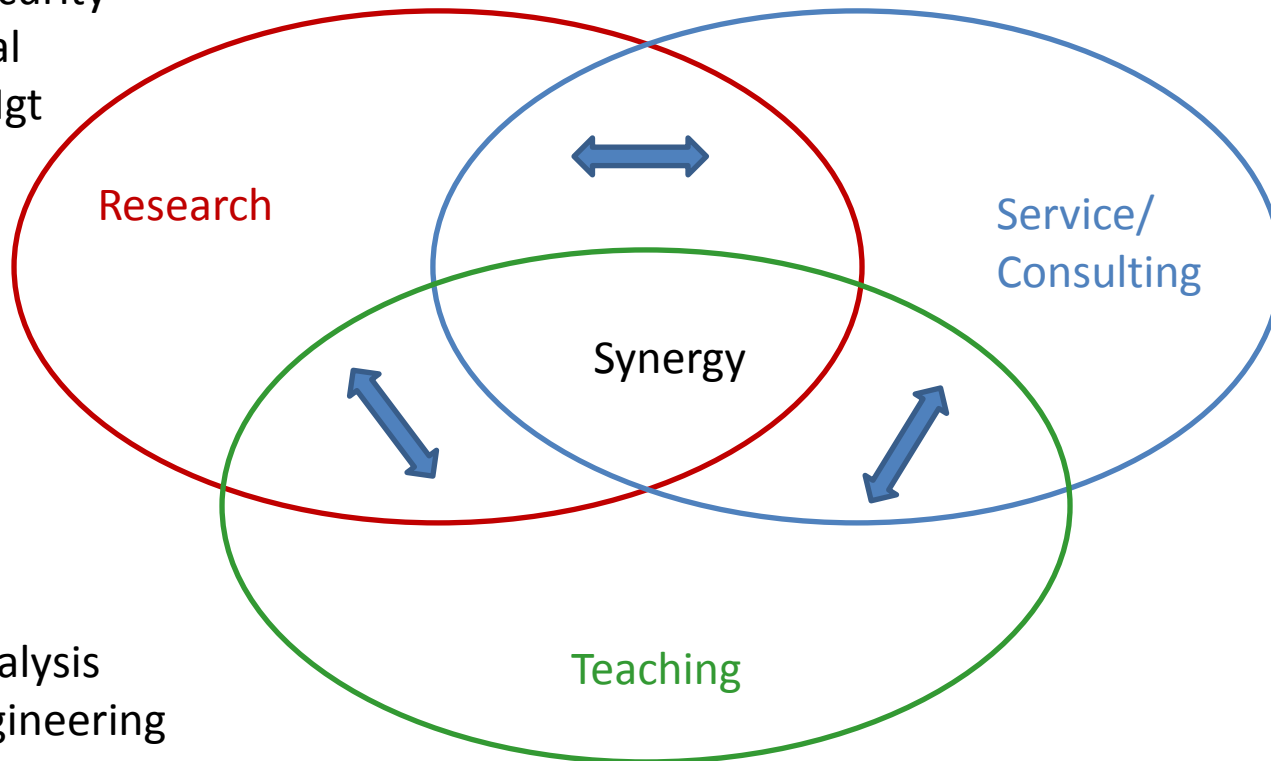


Advice for Researchers

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4. Creatively define the opportunity
5. Think about uncertainty
6. Learn to communicate
- 7. Look for synergy**

7. Look for synergy

Decision Analysis
Military
Intelligence
Homeland Security
Environmental
Operations Mgt
Other



Decision Analysis
Systems Engineering
Management Science
Operations Research
Operations Management
Project Management

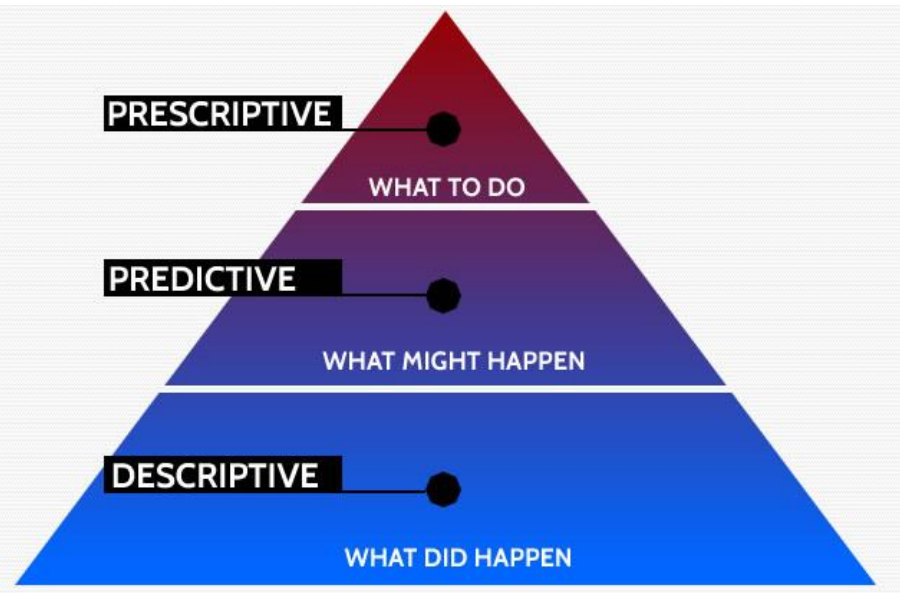


Advice for Researchers

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5. Think about uncertainty
6. Learn to communicate
7. Look for synergy
- 8. Understand analytics**



8. Understand analytics



Prescriptive analytics

Evaluates and determines **new** ways to operate

Targets business objectives

Balances all constraints

Predictive analytics

Predicts **future** probabilities and trends

Finds relationships in data that may not be readily apparent with descriptive analysis

Descriptive analytics

Prepares and analyzes **historical** data

Identifies patterns from samples for reporting of trends



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7. Look for synergy
8. Understand analytics
- 9. Build partnerships and teams**

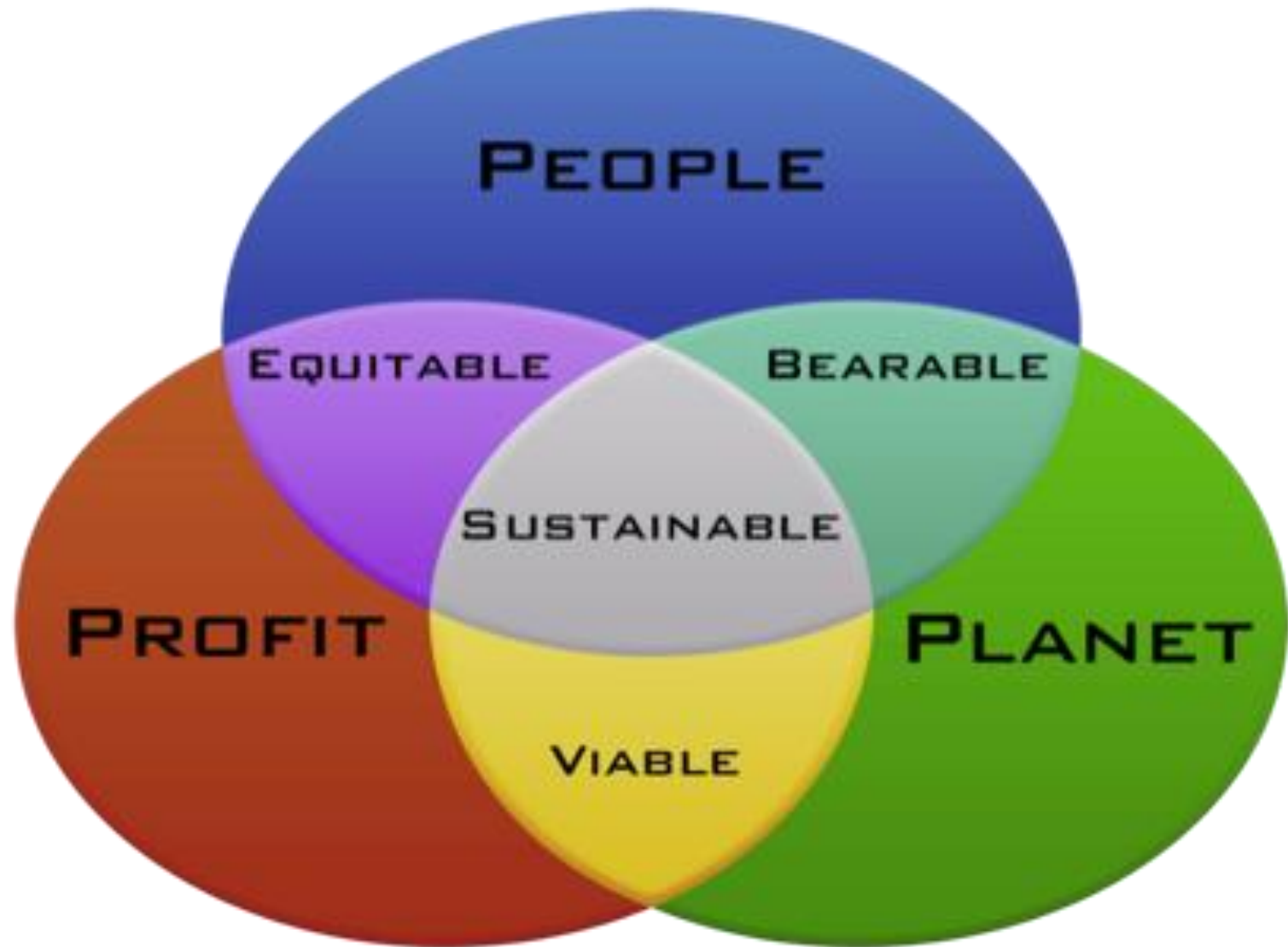




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8. Understand analytics
9. Build partnerships
- 10. Focus on the Triple Bottom Line**

10. Focus on the Triple Bottom Line





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