34th Annual INCOSE international symposium

hybrid event

Dublin, Ireland
July 2 - 6, 2024

A Model of an Effective Technical Leader

Using Systems Thinking as a Foundation

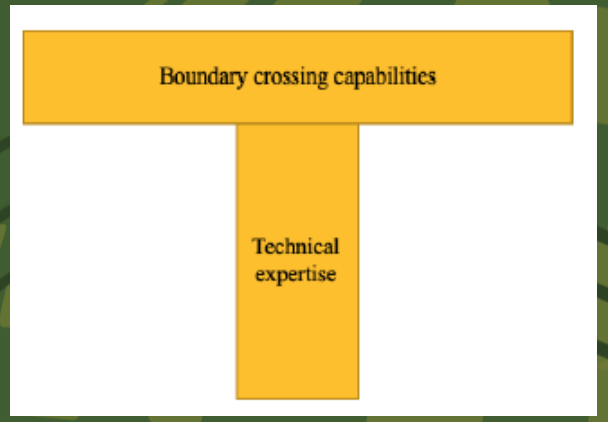
Outline

- Introduction
- Technical Individuals vs Leaders
- Technical Expertise Models
- W-Shaped Model Introduction
- Application of Systems Thinking
- Final Model of an Effective Technical Leader
- Conclusions

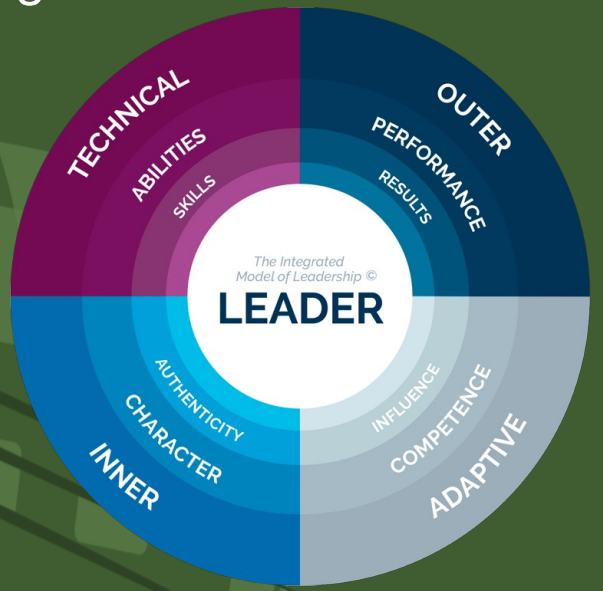
Introduction

- Technical persons and leaders well understood and defined with various models separately

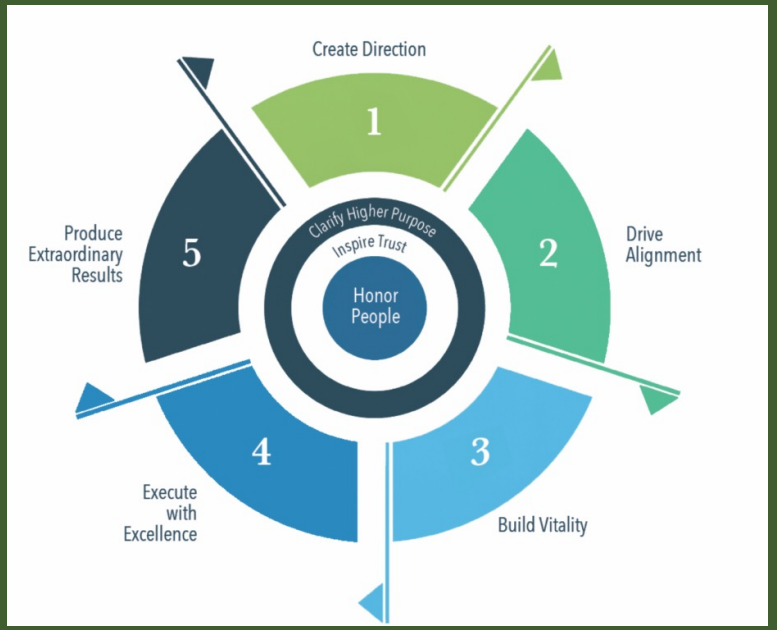
T-Shaped Person



Integrated Model of Leadership

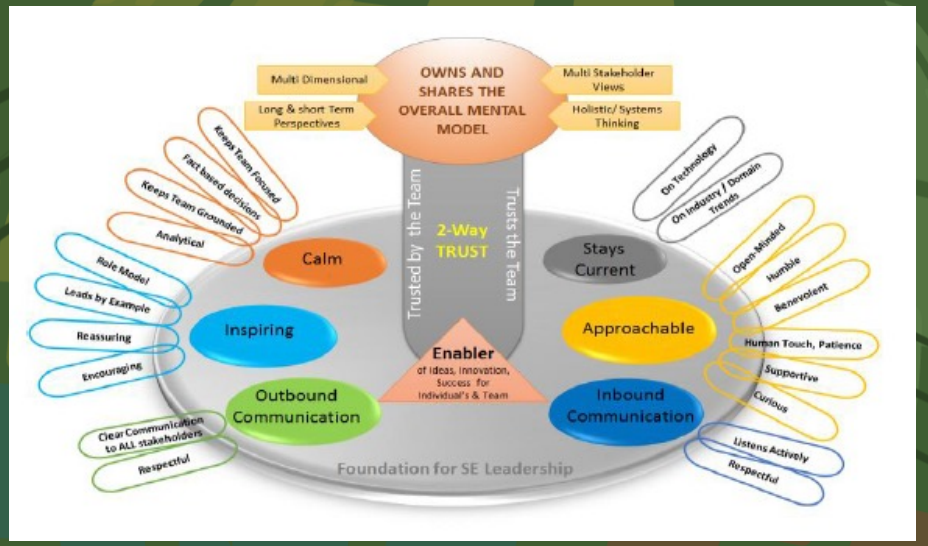


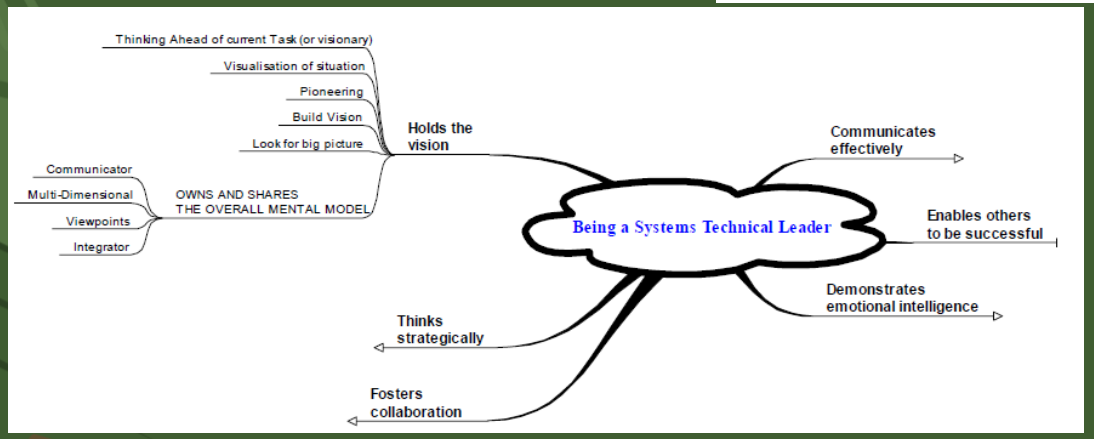
Conant Leadership Flywheel



Introduction

- Technical Leadership is referenced in various papers, but lack modeling
  - Godfrey, et. al. created integrated models for SE leadership
- All focus on specific skills/talents





Introduction

- A Technical Leader… (Godrey, et. al.)
  - Holds the vision,
  - Thinks strategically,
  - Fosters collaboration,
  - Communicates effectively,
  - Enables others to be successful, and
  - Demonstrates emotional intelligence

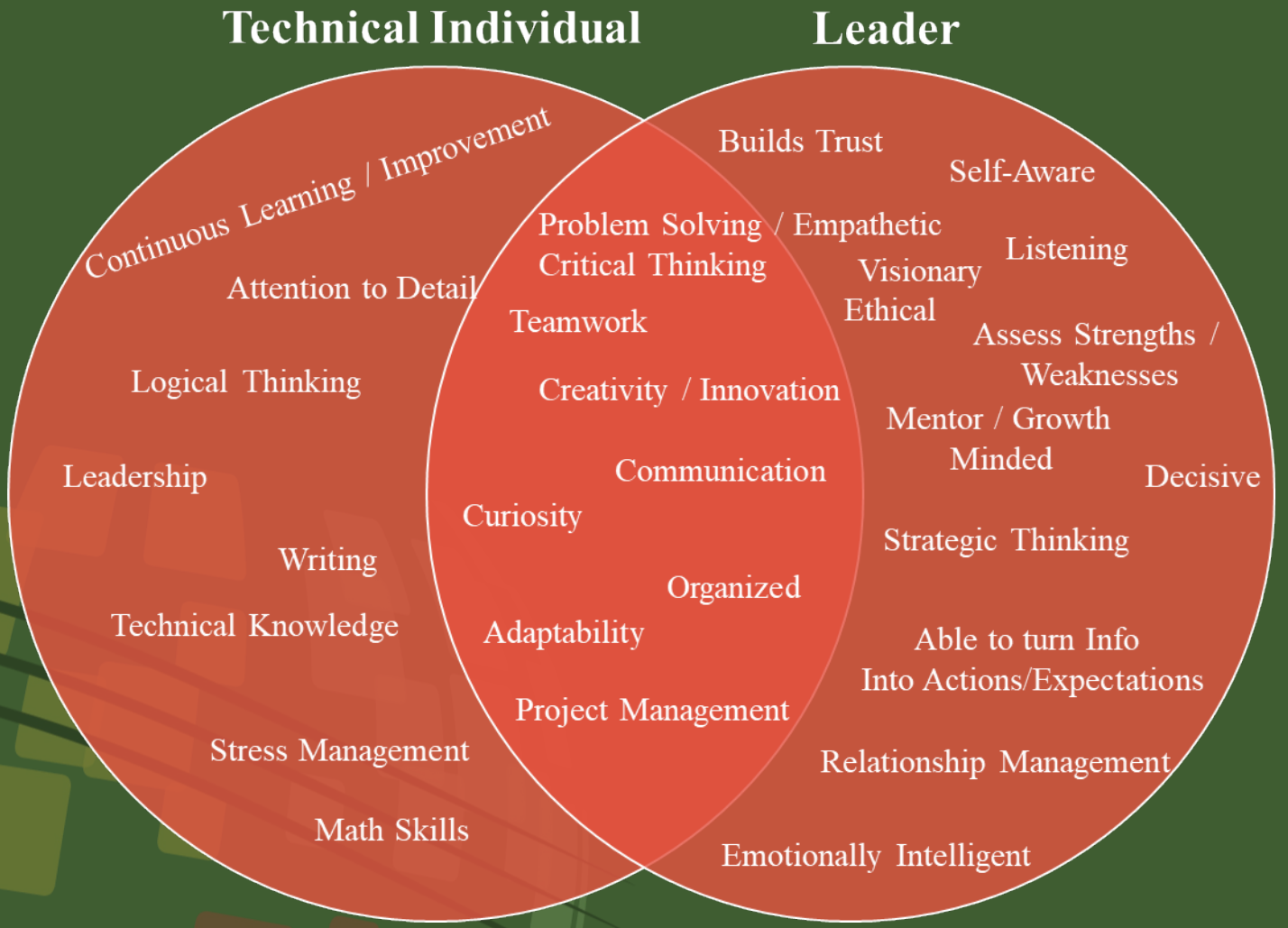
- However, these are not specific to a *Technical* Leader

Questions

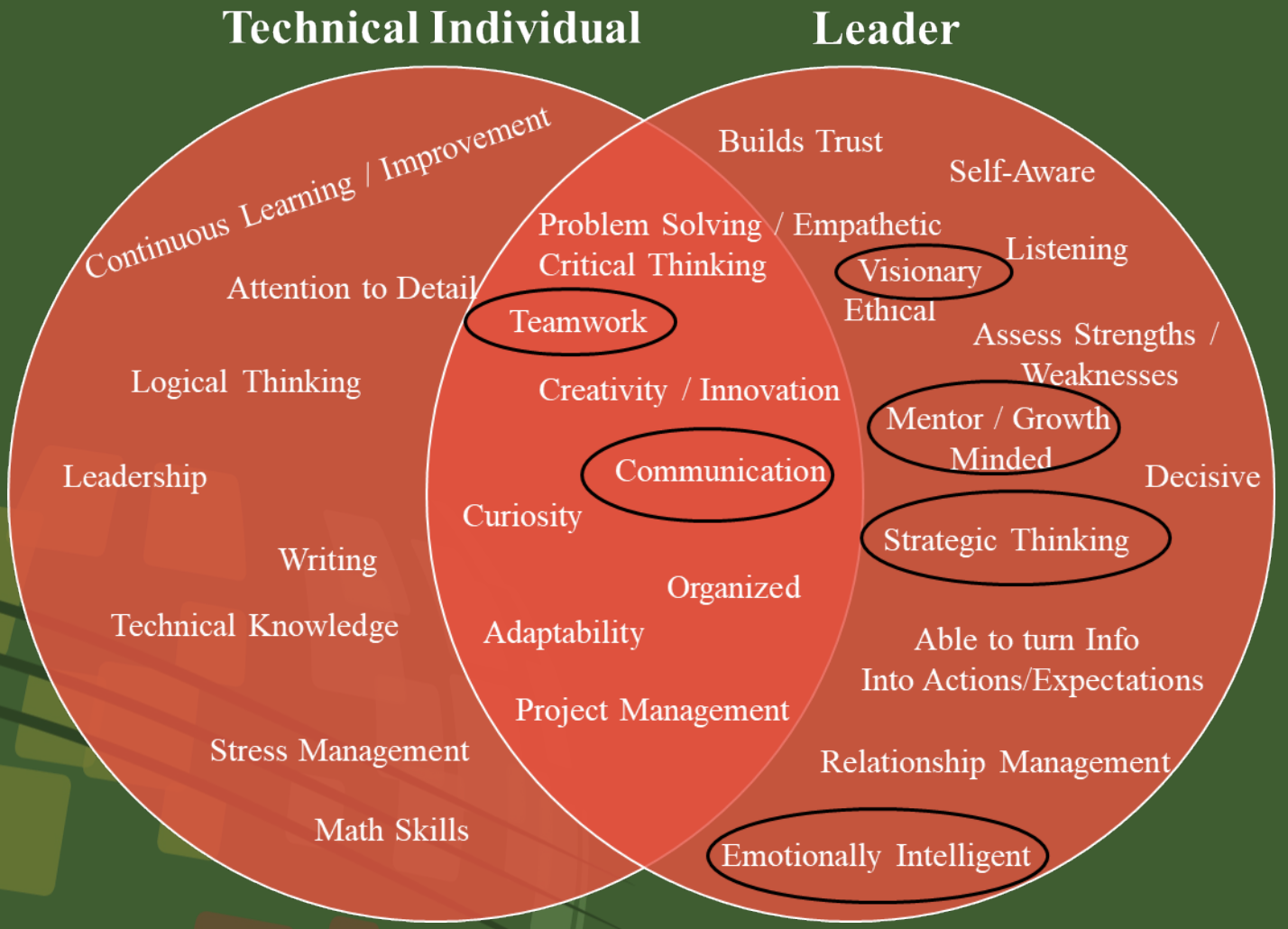
- What are the overall skills and behaviors required of a Technical Leader?

- How do we create a higher-level integrated model of an effective Technical Leader?

Technical Individual vs Leader



Technical Individual vs Leader



Where to go From Here?

- Overlap of some skills exist, but we don’t have a model
- Can categorize the left and right of the Venn Diagram into “Technical Expertise” and “Leadership Skills”
- Review “Technical Expertise” models

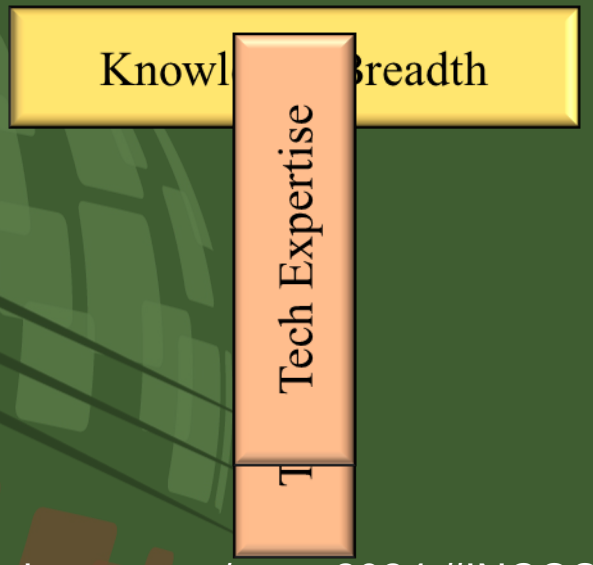
Technical Expertise Models

I-Shape

- Simplest model
- Only has expertise in a single area
- Example: Proficient in Requirements Engineering

T-Shape

- Has expertise in a single area, but understands multiple others
- Example: Proficient in Requirements, but also understands Architecture, Acquisition, and Risk Management

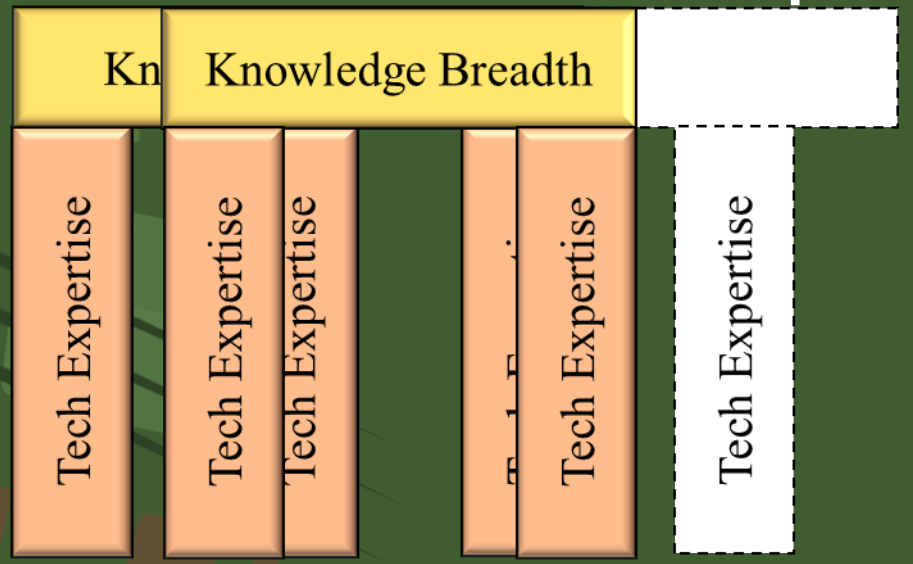


Pi-Shape

- Has expertise in two areas and understands multiple others
- Example: Proficient in Requirements and Architecture, understands Acquisition, and Risk Management

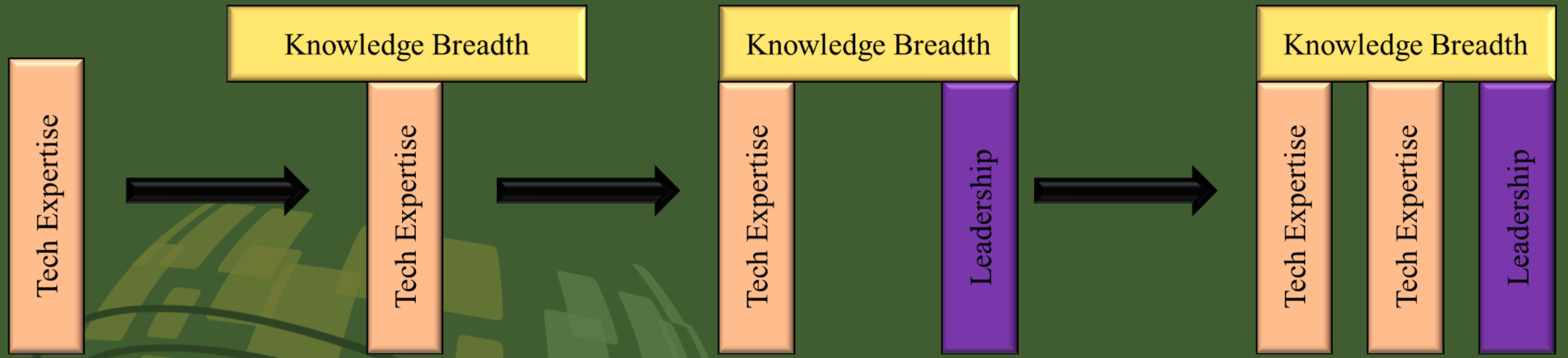
M-Shape (or Comb-Shape)

- Has expertise in multiple areas and understands multiple others
- Example: Proficient in Requirements, Architecture, Interfaces, etc., understands Acquisition, and Risk Management



W-Shaped Model

Evolution from I- to M-Shape



Early Career

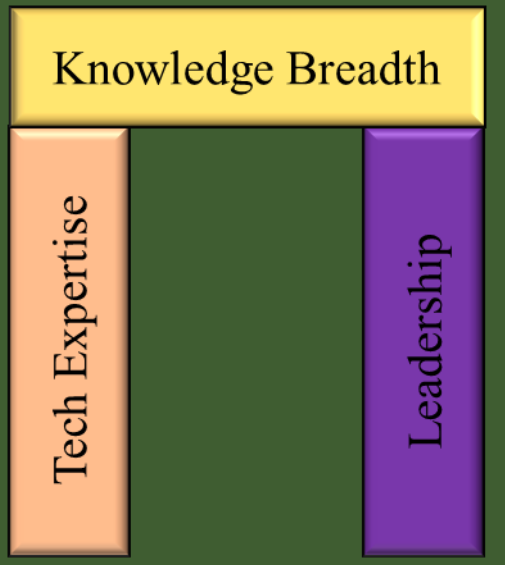
Mid-Career Technical Individual

Mid-Career, aspiring Technical Leader

Later Career, aspiring Technical Leader

Why are we Defining These Models?

- The Pi-Shaped individual with breadth of knowledge, technical expertise, and leadership skills begins to model a typical leader
- However, something is missing…



Systems Thinking!

Systems Thinking

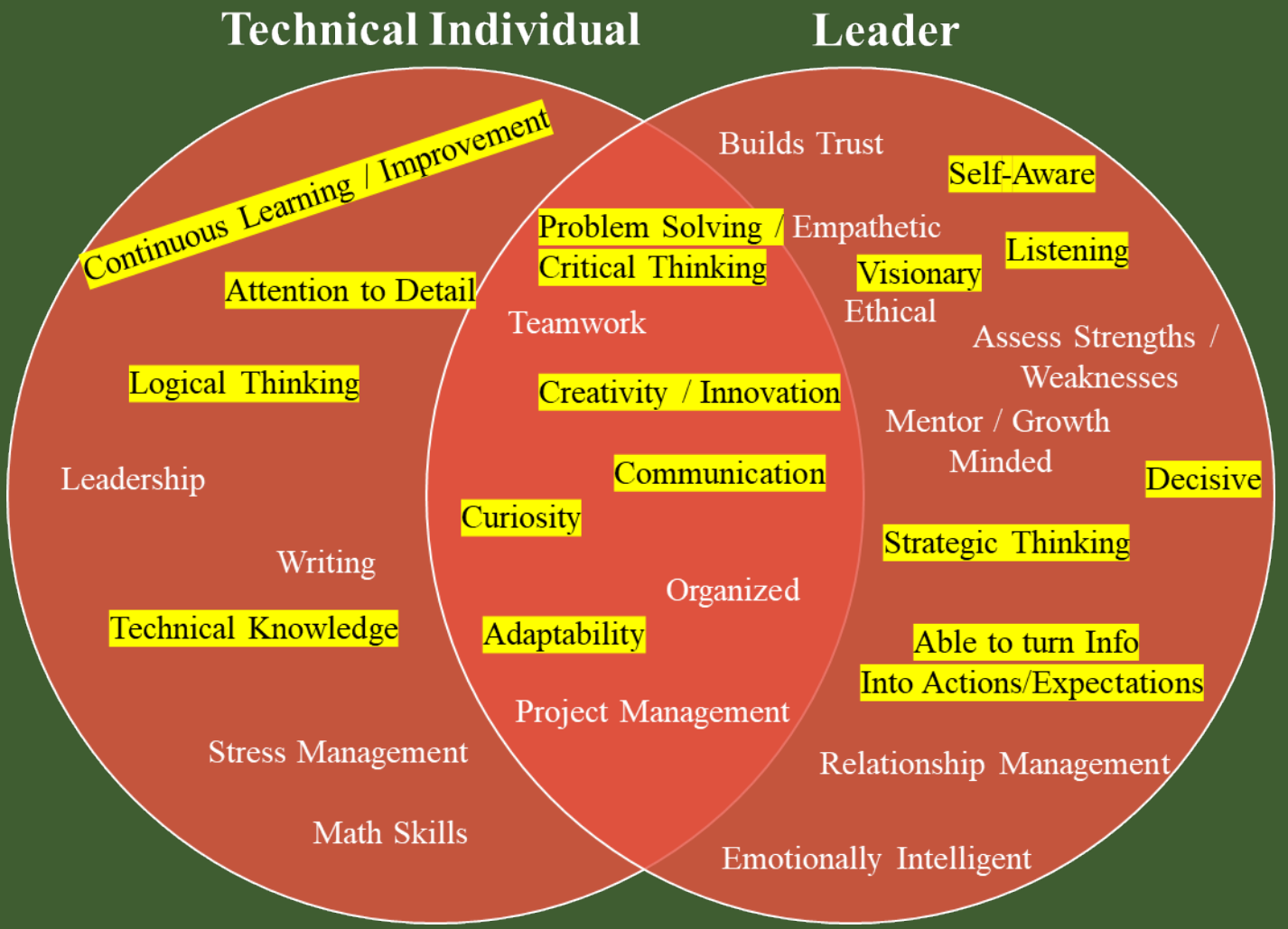
- These three skillsets may model a Technical Leader, but they do not model an *effective* Technical Leader

- We need to add Systems Thinking to the model, but where and how?

14 Habits of Systems Thinking

How Does Systems Thinking Apply?

Systems Thinking Habits	Technical/Leader Behaviors/Skills
Seeks to understand the big picture	Curiosity (T/L) Strategic Thinking (L)
Observes patterns/trends with time	Logical Thinking (T) Problem Solving/Critical Thinking (T/L)
Recognize time delay effects in cause and effect relationships	Attention to Detail (T) Problem Solving/Critical Thinking (T/L) Strategic Thinking (L)
Considers mental models effects on reality and the future	Creativity/Innovation (T/L) Visionary (L)
Considers an issue fully w/o jumping to conclusions	Attention to Detail (T) Logical Thinking (T) Communication (T/L) Listening (L) Decisive (L)
Uses understanding of system structure to ID leverage actions	Technical Knowledge (T) Turn info into Actions (L)



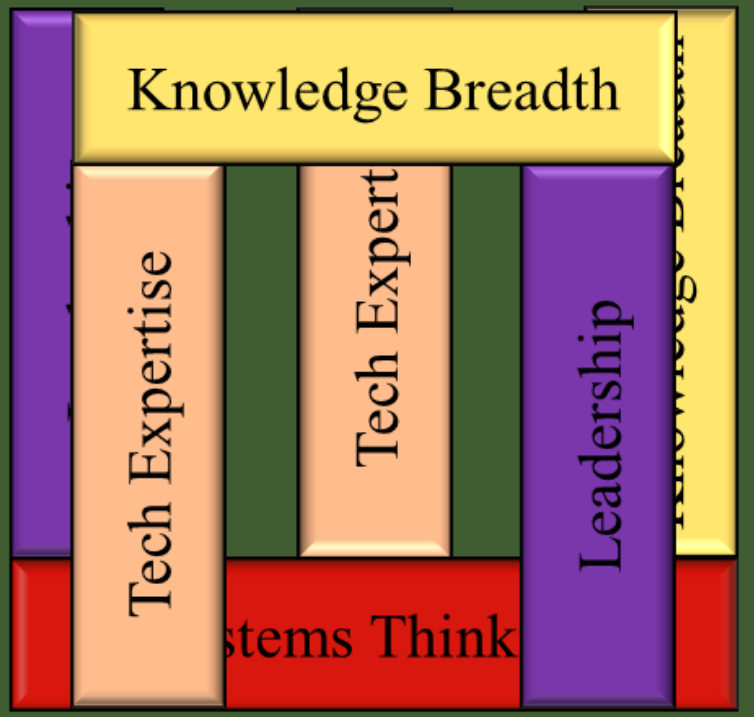
Systems Thinking as a Foundation

- Many of the skills/behaviors across both Technical Individuals and Leaders can be mapped to a Systems Thinking habit

- Systems Thinking is inherently foundational to being an effective Technical Leader

W-Shaped Model of an *Effective* Technical Leader

- Add Systems Thinking to the Pi-Shaped model of a Technical Leader as the foundation!
- Leadership Skills, Technical Expertise, and Knowledge Breadth build upon the foundation



Conclusions

- Many models of technical individuals and of leaders defined
- Integrated model of an effective technical leader does not exist
- Defined behaviors/skills of technical individuals and leaders, proved an overlap, related to Systems Thinking concepts

Integrated technical and leadership behaviors/skills with Systems Thinking to develop a novel model of an effective technical leader

Thank you!

Questions

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