

Prometheus Unbound

Releasing Naval Innovation in the 21st Century

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Terminology

Invention

Adoption

Adaptation

*Revolution in Military Affairs
(RMA)*



“[The Department of Defense] does not have an invention problem; it has an innovation adoption problem.”

Eric Schmidt, Google's former Chief Executive Officer and the Chair of the Defense Innovation Board, testifying before Congress, April 2018.

Born to Innovate

1794: Audacious new US Navy designs and builds six innovative, high technology Frigates. Most powerful Frigates in the world.

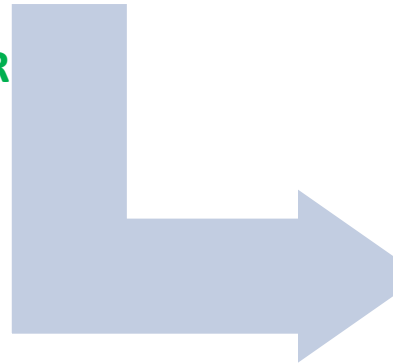


Frigate USS Constitution (Official US Navy Photo)

In **1861-1862**, the US Navy produced three ironclad ships in four months

100 Days

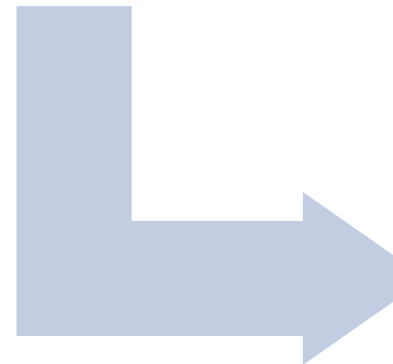
WON THE CIVIL WAR



Between **1881 and 1891**, the US Navy produced five warship designs

10 Years

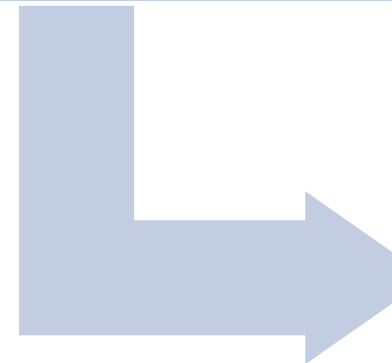
**WON THE SPANISH-AMERICAN WAR
AND
WON WORLD WAR I**



Between **1921 and 1941**, the US Navy produced
62 airplane designs, including:
22 fighter designs
21 seaplane designs
Eight dive bomber designs

20 Years

WON WORLD WAR II



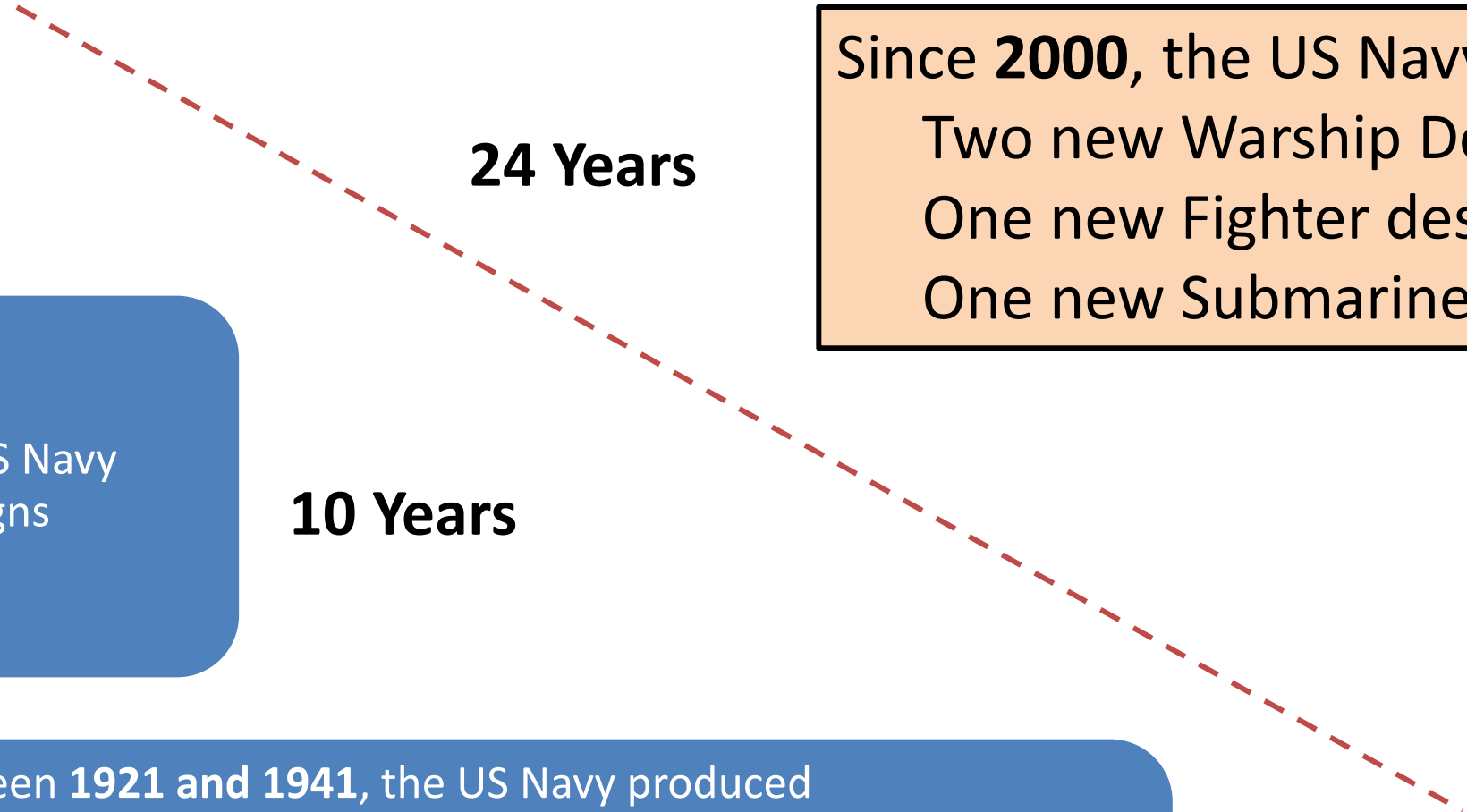
Between **1955 and 1961**, the US Navy produced
11 nuclear submarine class designs
(Including two missile submarines)
One nuclear-powered cruiser
One nuclear-powered aircraft carrier

Seven Years

WON THE COLD WAR

Since **2000**, the US Navy has produced
Two new Warship Designs
One new Fighter design
One new Submarine design

24 Years



Industrial Revolutions and Naval Use Cases

Base Case: Six Frigates

First Industrial Revolution

Steam Propulsion
Shell
Rifled Ordnance
Armor
Screw Propellers



1776 - 1870

Third Industrial Revolution

Nuclear power
Submarine-launched Ballistic Missiles
Data Networks
Digital Radar
Guided Missiles
Digital Computers
Outer Space
Modularity



1950 - 2000

Second Industrial Revolution

Steel hulls
Naval Rifles & Fire Control Systems
Torpedoes
Submarines
Naval Combatant Design
Radio
Naval Aviation
Radar



1870 - 1950

Fourth Industrial Revolution

Edge to Cloud
Virtualization
Autonomy
Drones:

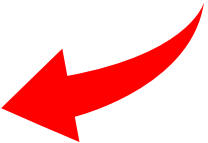
- UAV – Uncrewed Aerial Vehicles (UAV)
- USV – Uncrewed Surface Vessel (USV)
- UUV – Uncrewed Undersea Vehicles (UUV)

Artificial Intelligence
Big Data
Multi-Domain Operations
Distributed Maritime Operations



2000 - Present

You are Here



US Navy autonomous warship (Official US Navy Photo)



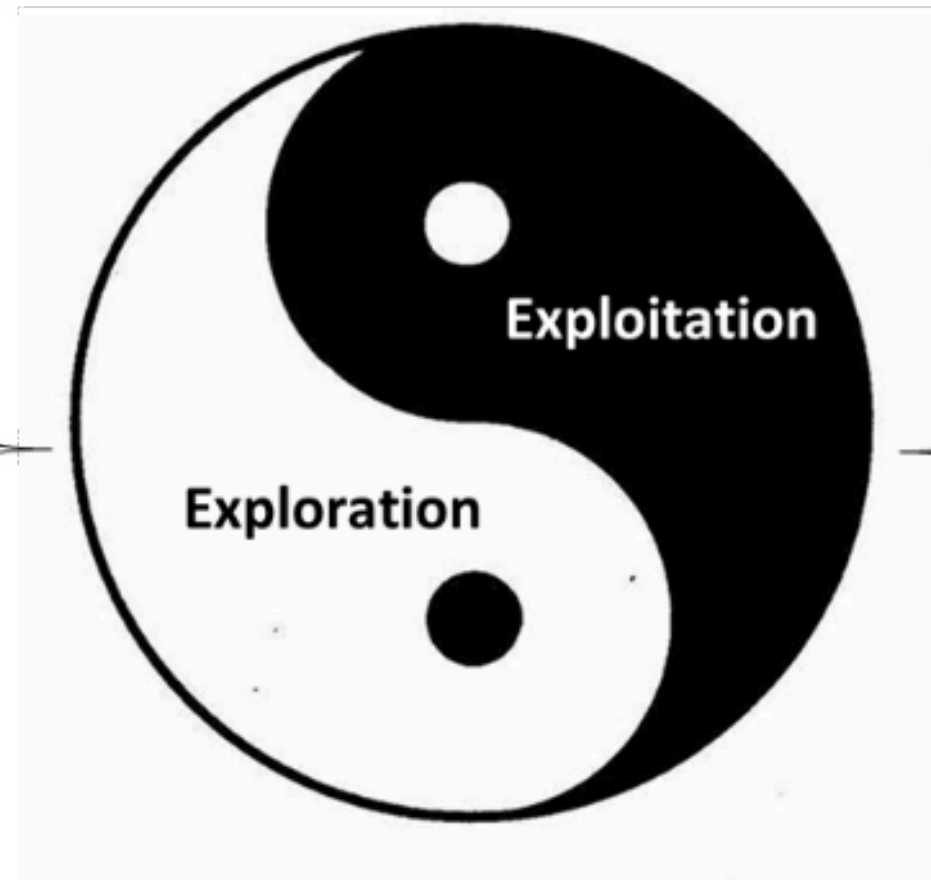
Leon Panetta, former Secretary of Defense and Director of the CIA, and Mike Gallagher, former Congressional Representative, recently wrote:

“The Defense Department must make the rapid adoption of new technologies a priority, particularly in the commercial sector. This will require Pentagon bureaucrats to overcome the aversion to risk that permeates their agency and to leverage the expertise of academia and the private sector. The goal will be to build a defense innovation ecosystem in which the brightest minds in technology, strategy and defense can collaborate without constraint” (Panetta and Gallagher, 2024).

The Yin and Yang of **Exploration** and **Exploitation** of Organizational Learning (York, 2020)

Considerations

- Search efforts pursue new possibilities and knowledge to remain viable and foster future growth
- Fosters Renewal
- Stresses research and an organization's learning processes or the acquisition such capabilities or outputs.
- Concerns situate in the reality that a firm predominantly exploring suffers from its inability to reap the rewards of its knowledge and maintain viability from such returns



Considerations

- Emphasizes the advancement and utilization of established knowledge or certainties
- Is essential for the firm to commercialize their knowledge capabilities and technologies
- issues exist for firms that excessively exploit, which become outdated or are surpassed by innovation because such activity fails to generate new offerings or novelties to sustain a competitive advantage

Exploration: Adopting New Technologies

Exploitation: Improving Known Technologies

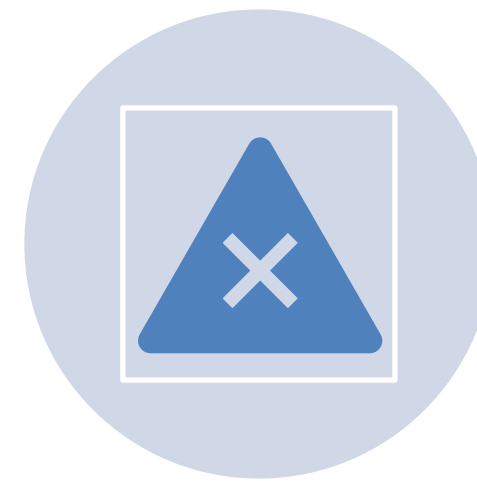
Brooks' Design Models



The rationalist believes that man is inherently sound (and reasonable), subject to mistakes, perfectible by education.

After the right education, maturing experience, and sufficient careful enough thought, a designer can make a flawless design.

The design methodology task, then, is to learn how to reason a design into flawlessness.

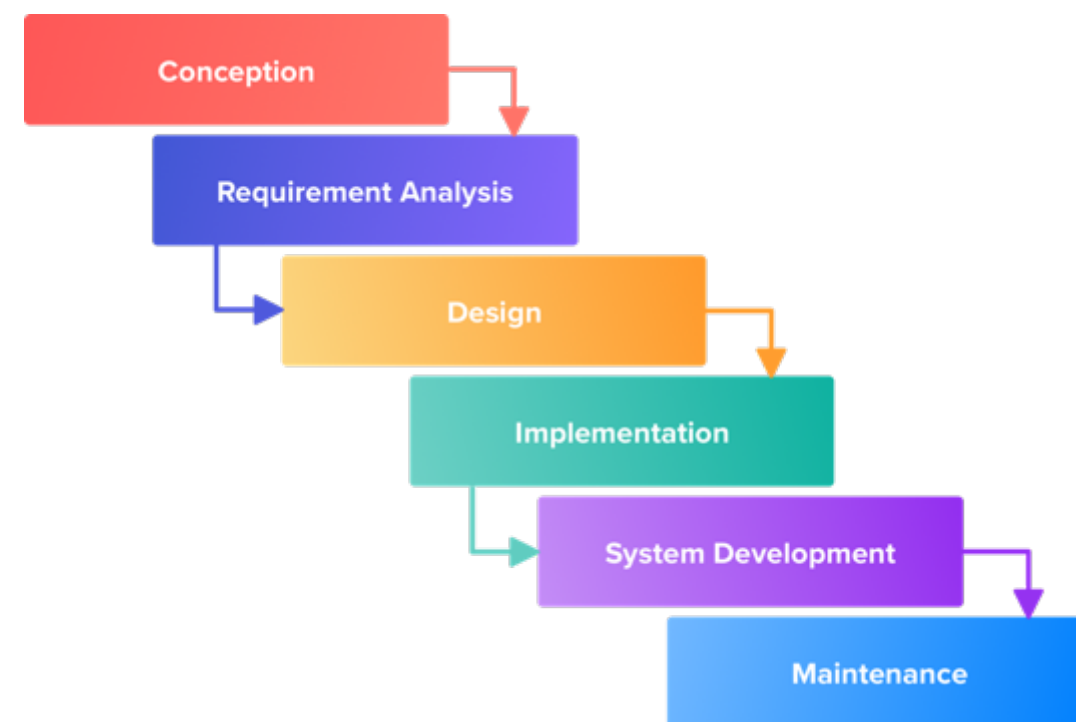


The empiricist believes that man is inherently flawed and subject repeatedly to temptation and error.

Anything he makes will be flawed.

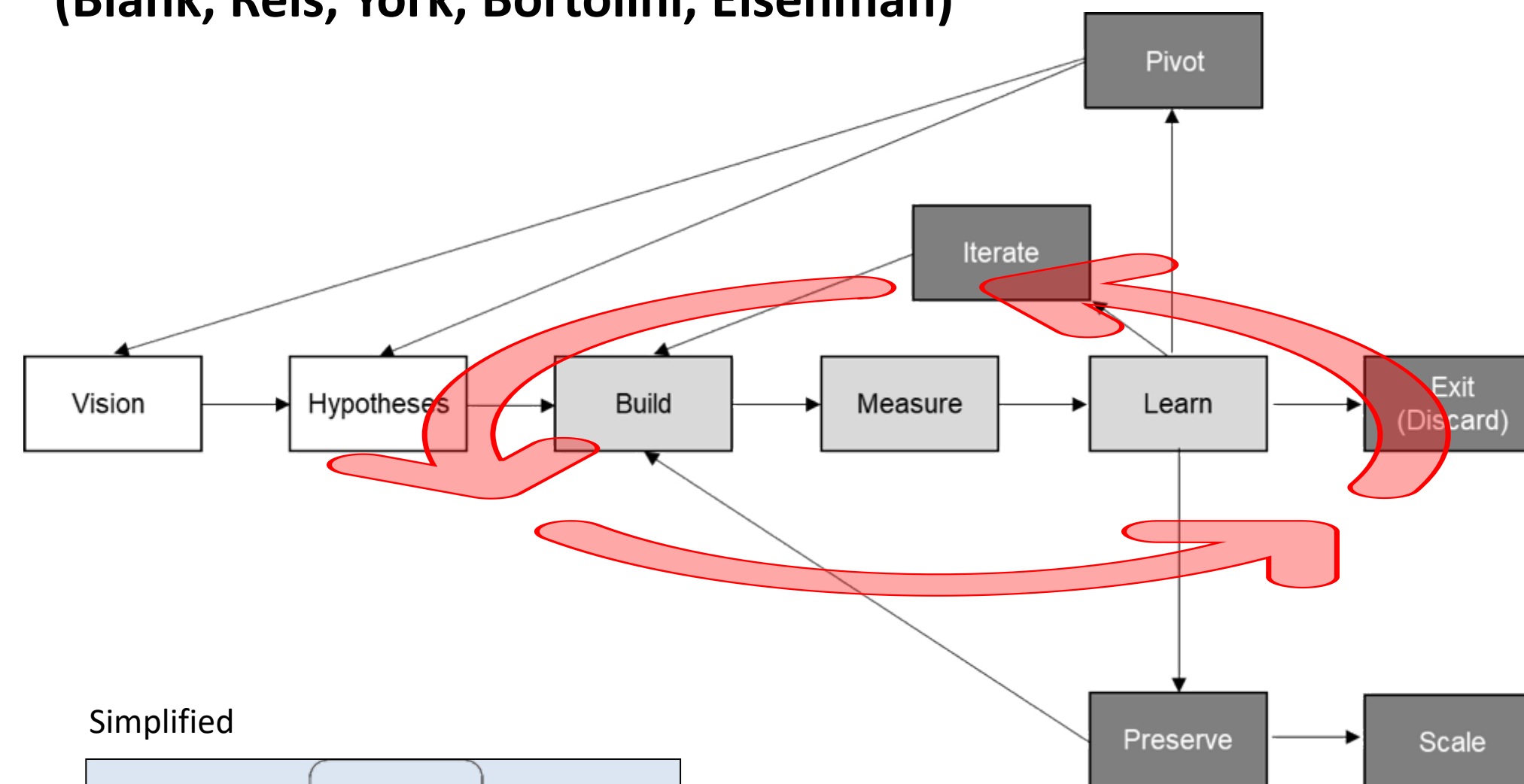
The design methodology task, therefore, is to learn how to determine the flaws by experiment, so that one can iterate on the design.

Product Development Conceptual Models

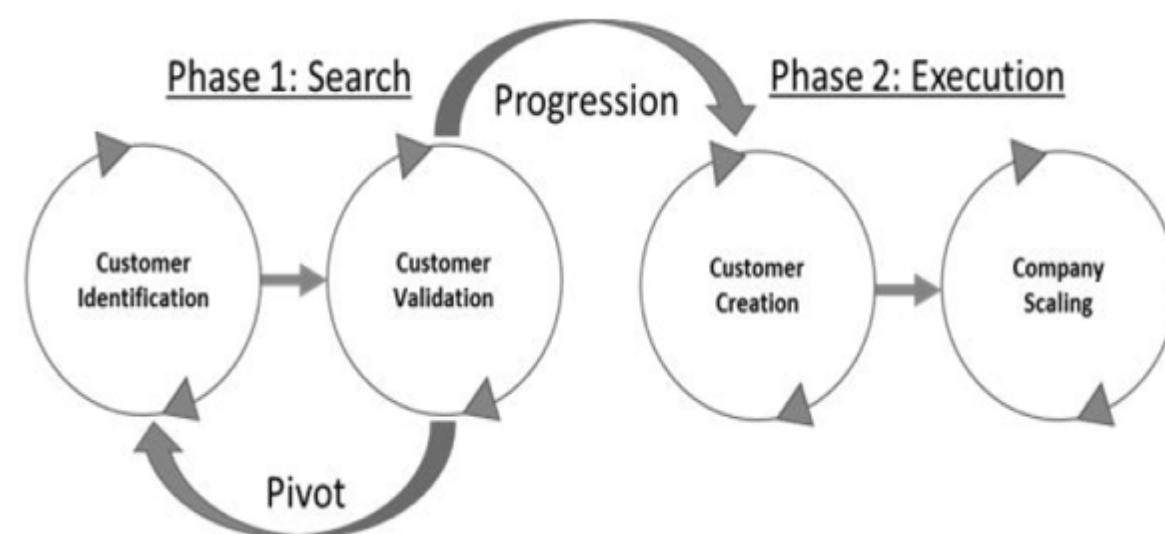
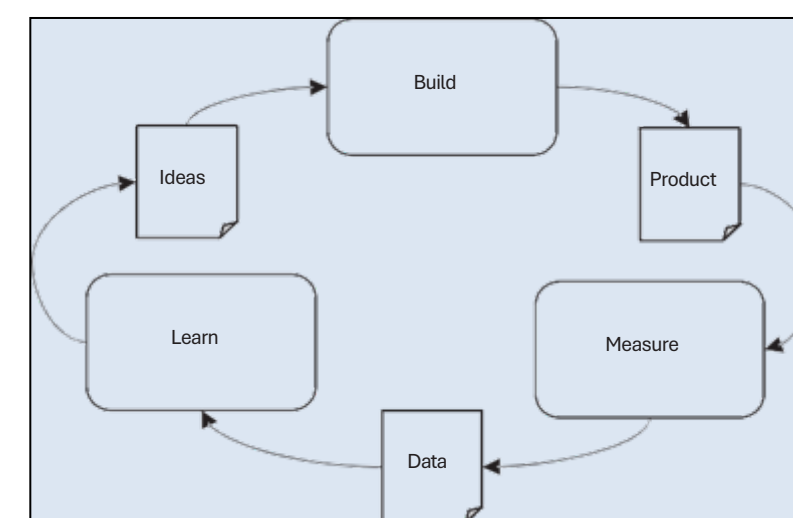


Blank's Product Development Model

Build, Measure, Learn (BML) Model (Blank, Reis, York, Bortolini, Eisenman)



Simplified



Blank's Customer Development Model

Denning & Dunham's novel 2010 structure provides a robust methodology and conceptual framework through their definitive, systematic approach to the adoption process.

Denning & Dunham define a ***Prime Innovation Pattern***

Phase I: The Main Work of Invention

1. Sensing
2. Envisioning

Phase II: The Main Work of Adoption

3. Offering
4. Adopting
5. Sustaining

Phase III: The Environment for the Other Processes

- 6 Executing
7. Leading
8. Embodying



Prime Innovation Pattern Conceptual Framework

Executing. Requires domain-specific and conversational skills. Effectiveness depends on completing actions within a domain as promised in conversations.



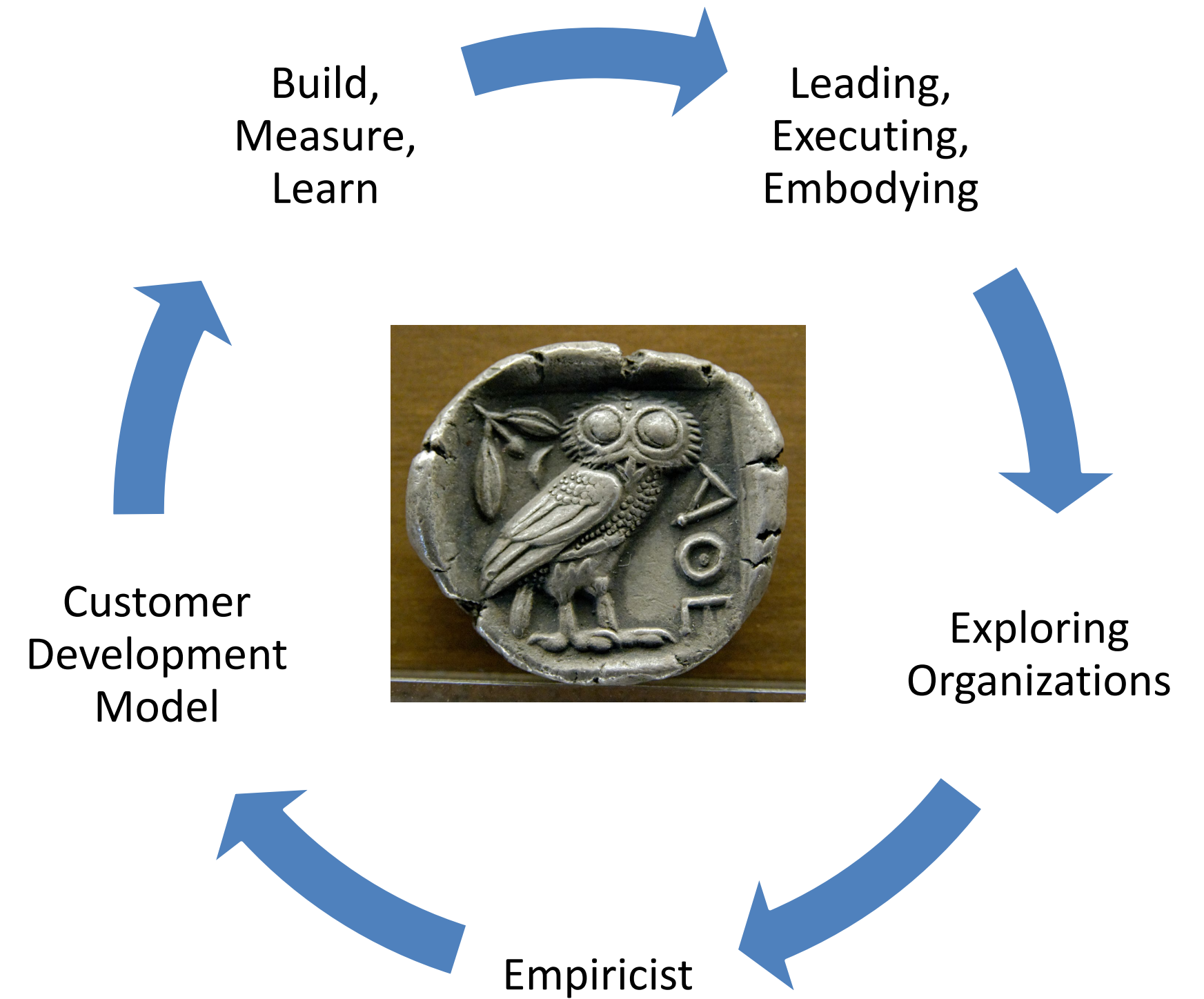
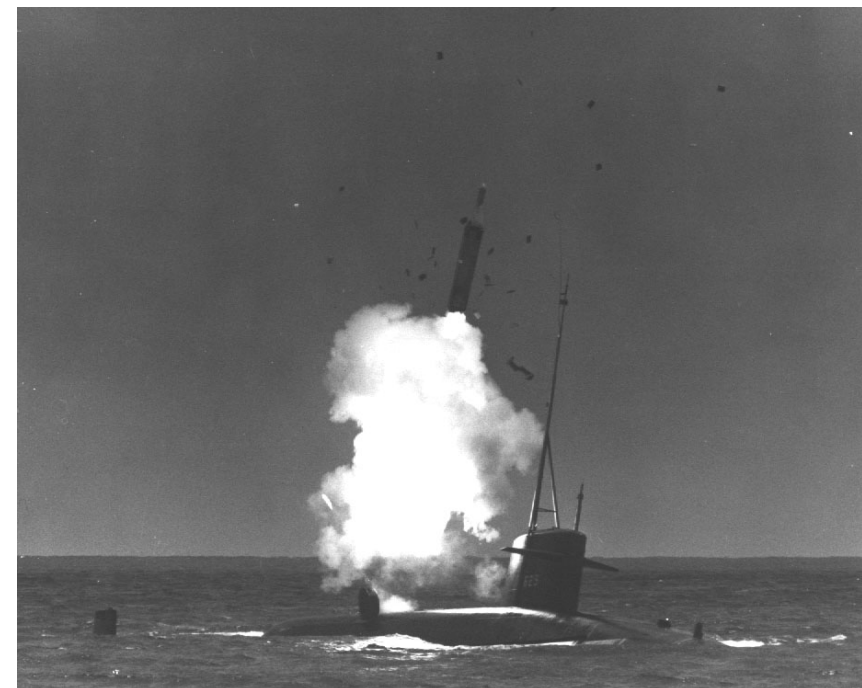
Leading. *"The point of innovation leadership is adoption and integration of new practices in a community, not sustaining the power of a leader"*



Embodying. *"The innovator's challenge is to get the members of a community to embody a new practice"*



“Prometheus Watches Athena Endow Mankind with Knowledge”



China has been improving every aspect of its military capability...The West must respond by procuring more advanced weaponry...and rebuilding the defense industrial base.

Peace through strength works.

-- Niall Ferguson and Condoleezza Rice



PLAN (Chinese) destroyer and US Navy Destroyer (Official US Navy Photo)