

Project Management Symposium

Capabilities-Based Planning

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PROJECT MANAGEMENT
CENTER FOR EXCELLENCE

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Let's Start with the End in Mind

Why Do So Many Programs Overspend and Overrun?

Because they are managed as if they were merely Complicated when in fact, they are Complex.

They're planned as if everything can be known at the start when in fact, they involve high levels of uncertainty that create cost, schedule, and technical risk. — *Architecting Systems: Concept, Principles, and Practice*, Hillary Sillitto, College Publications, 2014



Sobering Thoughts About Managing Complex Systems



NEW SYSTEMS MEAN NEW PROBLEMS

Unconstrained System – a collection of component systems, simple or complex, managed, operated, developed, funded, maintained, and sustained independently of its overarching principal system that creates a new capability.

Complex System – a collection of large, multifaceted, and interrelated component systems that are dependent on the entirety of the principal system for management, operations, development, funding, maintenance, and sustainment. Complex systems are non-deterministic, adaptive, holistic, and with nonlinear interfaces between attributes.

IN COMPLEX SYSTEMS, MALFUNCTION AND EVEN TOTAL NON-FUNCTION MAY NOT BE DETECTABLE FOR LONG PERIODS, IF EVER



Stating the Capabilities Deciphers the Intent of Management[†]



Never tell people how to do things. Tell them what needs to be done and they will surprise you with their ingenuity.

I need the capability to move a brigade of 3,000 to 5,000 troops 100 miles in ten hours.
Capabilities-based planning specifies the outcome but does not specify how to cause that outcome to appear.

Action	Outcome
Implement	Strategy
Ensure	Capabilities
Prioritize	Problems And Solutions
Identify	Redundancies
Deliver	Solutions

[†] [Kossakowski]



What is Capabilities-Based Planning?

TOGAF 9.1 Tells Us CBP ...

- Focuses on the planning, engineering, and delivery of capabilities to the enterprise.
- Is a technique for planning of investments in capabilities that contribute to realizing a specific organizational strategy.
- Take the form of business or technology improvement projects



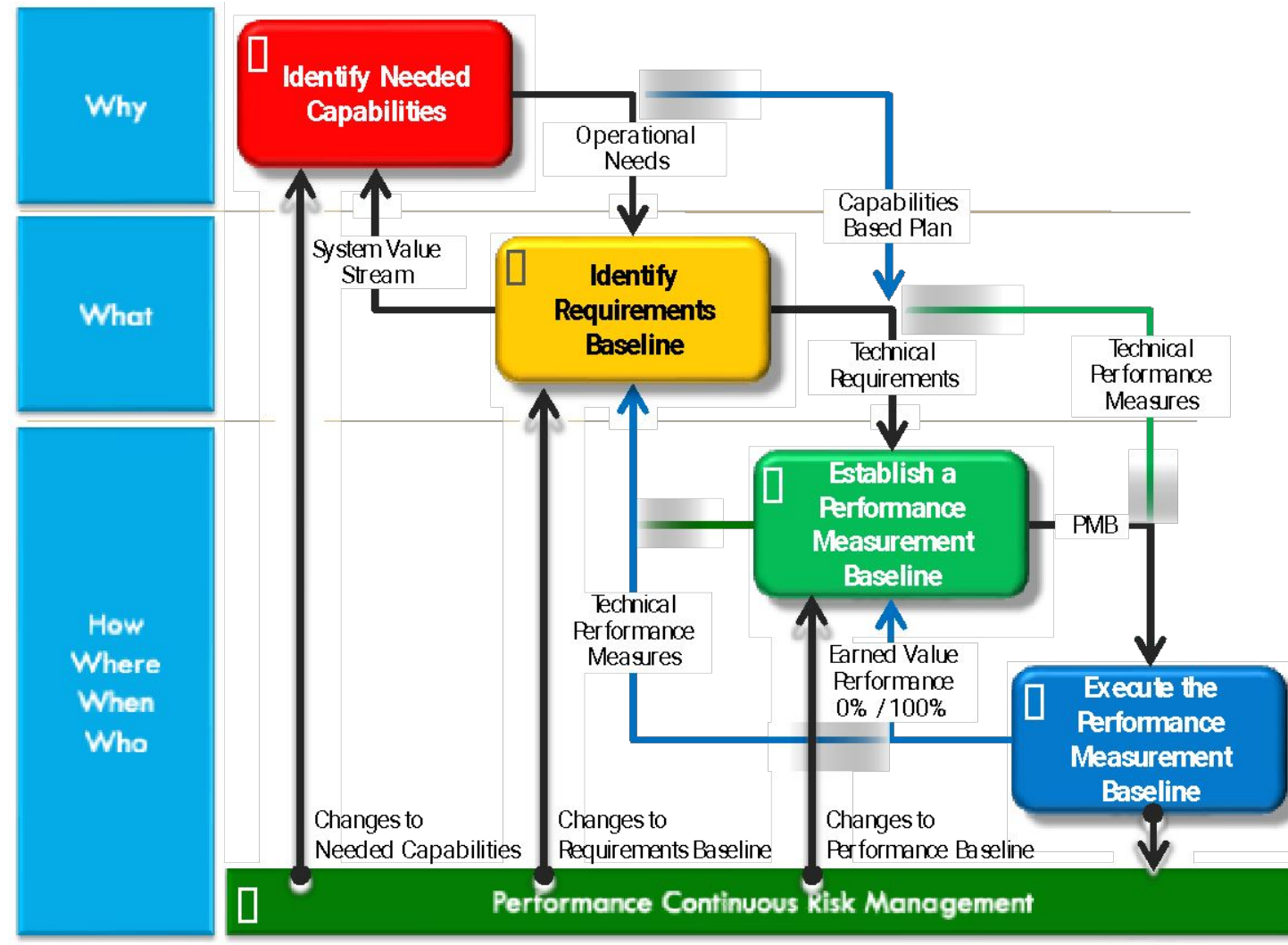
Project Success Starts with Capabilities-Based Planning

Capabilities Based Planning is planning, under the conditions of uncertainty, to provide capabilities suitable for a wide range of business challenges and circumstances while working within an economic framework.

- What capabilities do we need to possess to accomplish our mission?
- What are the Measures of Effectiveness (MOE) and Measures of Performance (MOP) for these Capabilities?
- What Technical Performance Measures are needed for each deliverable that fulfills the MOE and MOP?



5 Practice Areas of Performance-Based Management^{© †}



1

Identify Needed Capabilities

Define the capabilities needed to achieve the desired objectives or a particular end state for a specific scenario. Define the details of who, where, and how these capabilities are to be accomplished, employed, and executed.

What capabilities are needed to fulfill the Business Case or program Mission?

1.1

Define Capabilities as Operational Concepts

- Partition system capabilities into classes of service within operational scenarios.
- Connect the capabilities to system requirements using some visual modeling notation.
- Define Measures of Effectiveness (MoE) and Measures of Performance (MoP).
- Define the delivery schedule for each measure of performance and effectiveness.

1.2

Define Capabilities with Scenarios or Use Cases

- Define scenarios for each system capability.
- Connect these scenarios to a Value Stream Map of the increasing maturity of the program.
- Assess value flow through the map for each needed capability.
- Identify capability mismatches and make corrections to improve overall value flow.

1.3

Assess Needs, Costs, and Risks of the Capability Simultaneously

- Assign costs to each system element using a value flow model.
- Assure risk, probabilistic cost and benefit performance attributes are defined.
- Use cost, schedule and technical performance probabilistic models to forecast potential risks to program performance.

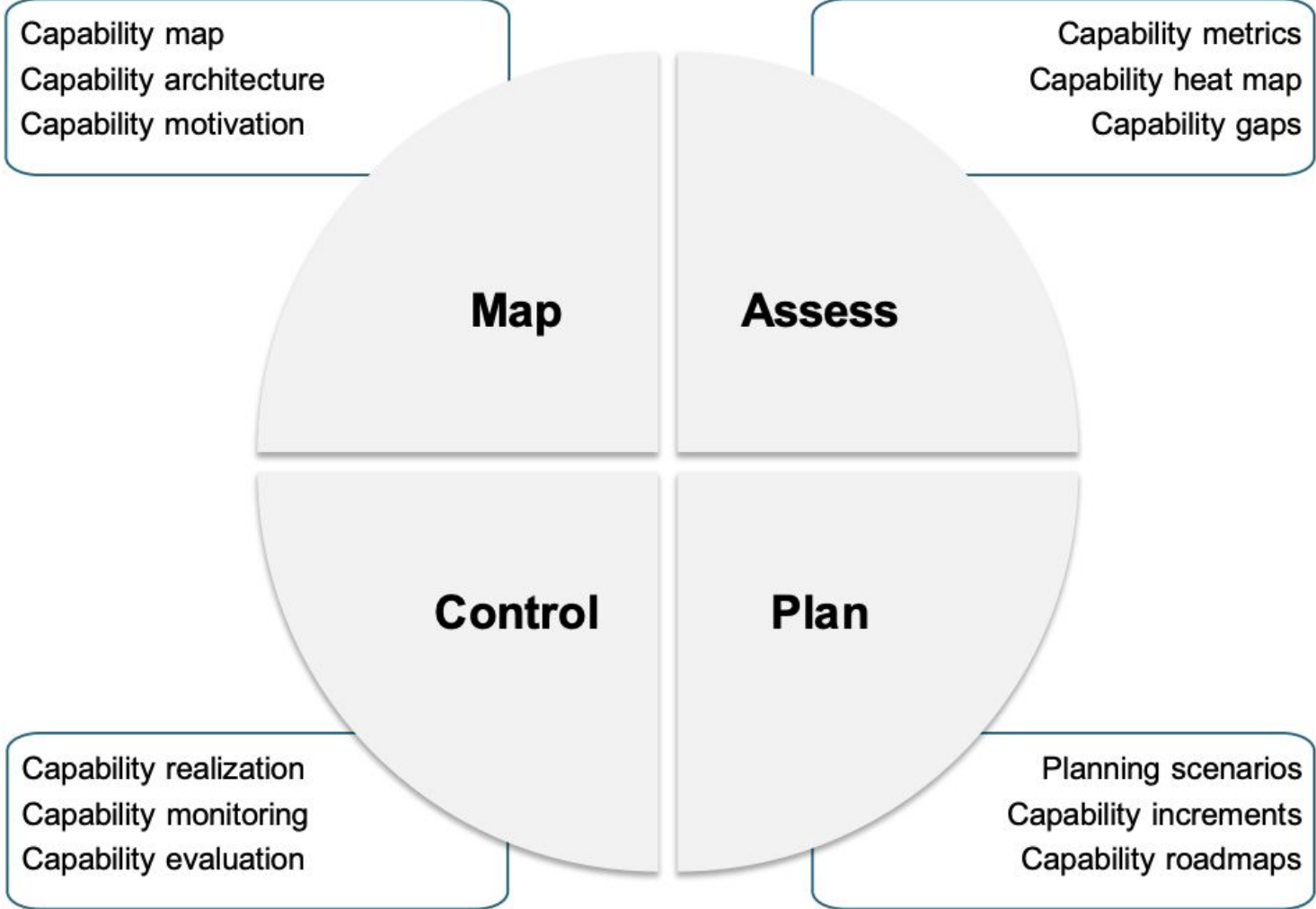
1.4

Define Explicit, Balanced, & Feasible Alternatives

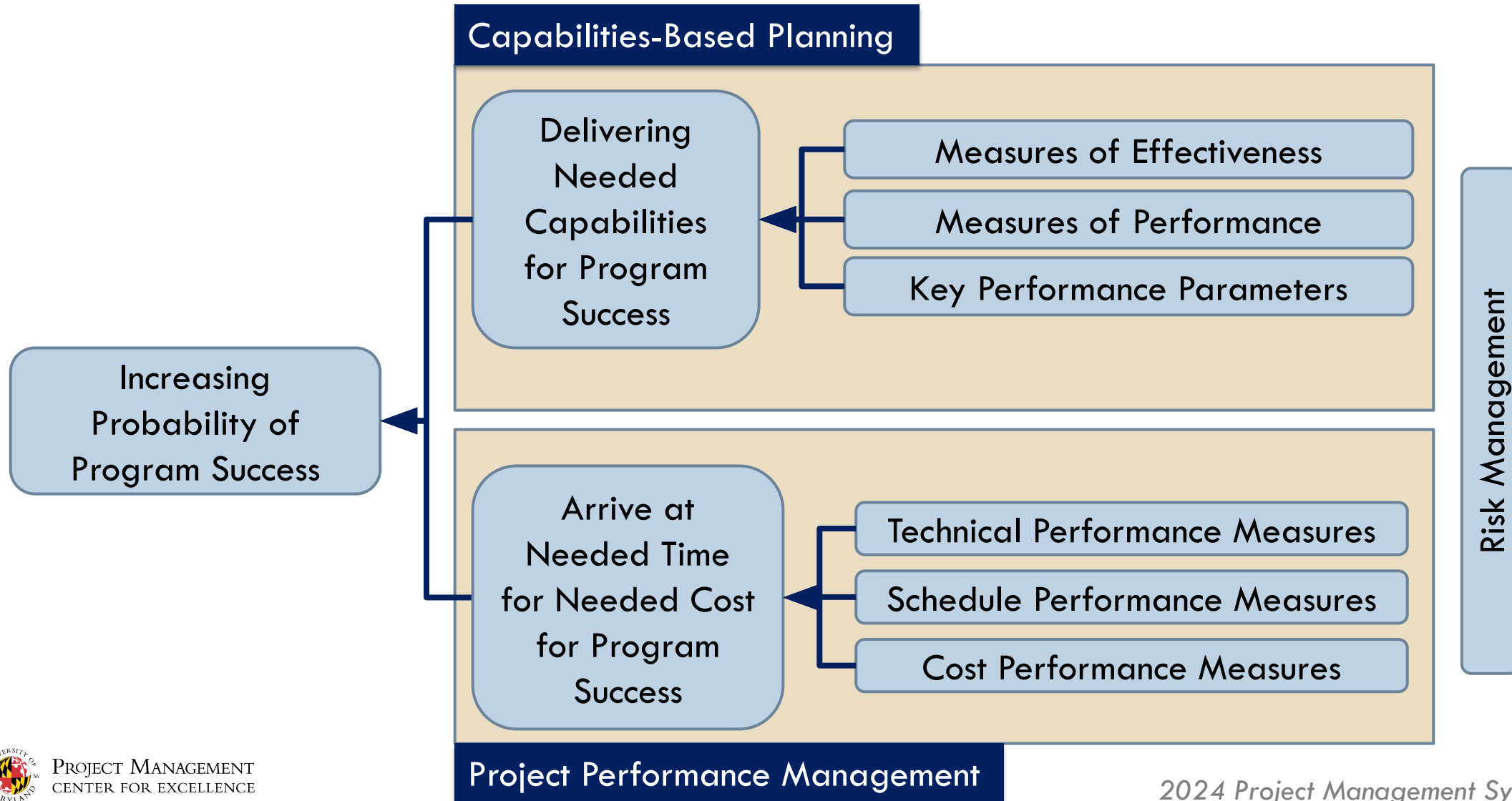
- Make tradeoffs that connect cost, schedule, and technical performance in a single location that compares the tradeoffs and their impacts.
- Use Measures of Effectiveness (MoE) and Measures of Performance (MoP) for these alternative tradeoffs.



Generic Steps of Capabilities-Based Planning



Connecting Capabilities-Based Planning and Project Performance starts with Shared Data and Processes



With MoEs and MoPs ...

- **What Key Performance Parameters (KPP) are expected for each Capability, and?**
- **What Technical Performance Measures (TPM) are needed from each deliverable to enable the MoE and MoP?**



Capabilities-Based Planning Fits Naturally with Business Priorities

- Strategy Creation and Implementation
- Business Development
- Business Process Improvement
- Integrated Program Management.

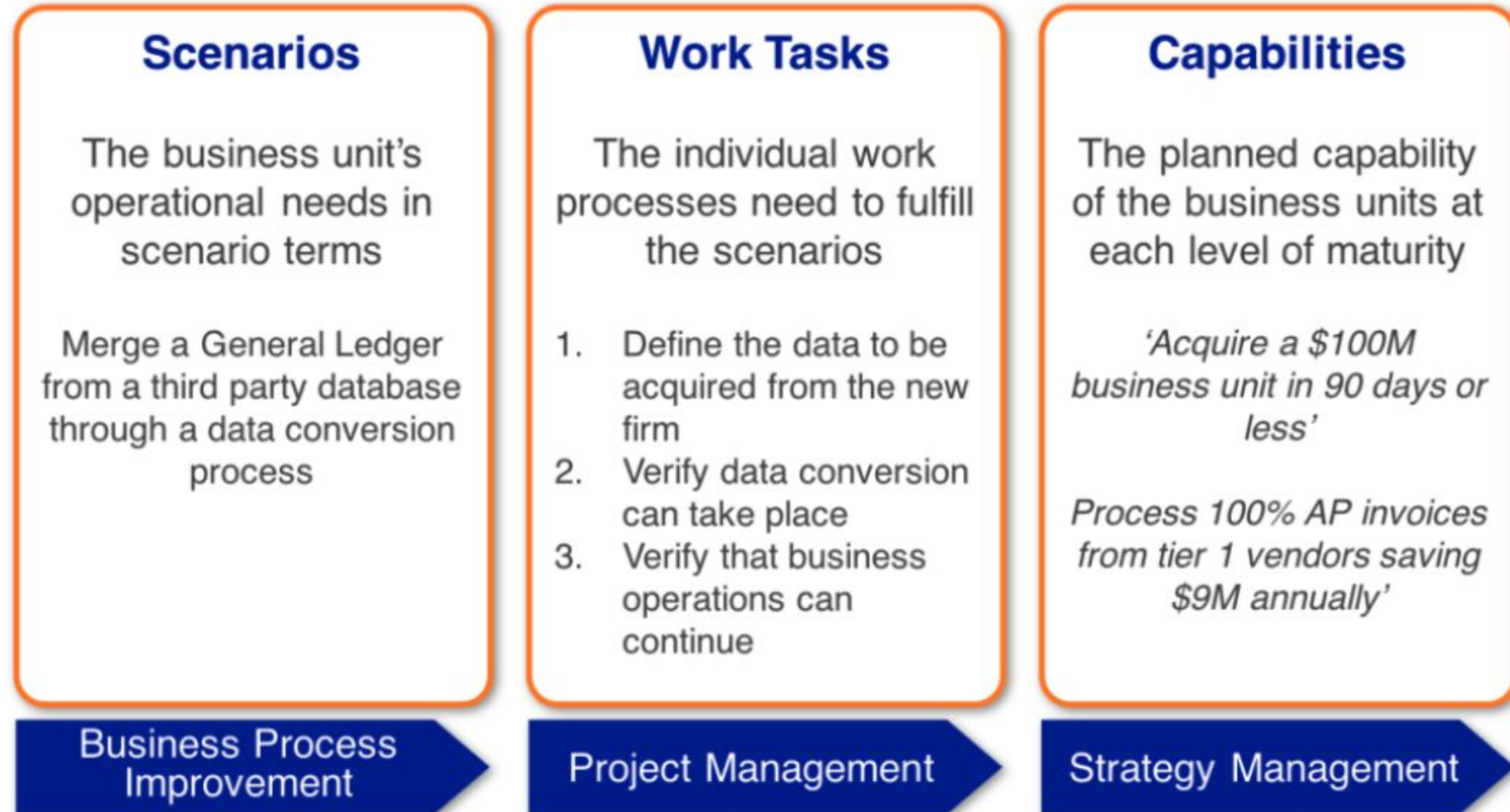


Capabilities Replace Features and Functions

- Tracing value to strategy requires features and functions be replaced by Capabilities
- Capabilities lay the groundwork adapting to change with emerging requirements while maintaining a Capabilities Baseline
- Features and Functions fulfill the stated requirements needed to implement the Capabilities
- Capabilities provide the basis to address unstated requirements in the future



Capabilities-Based Planning - Schematic



Capabilities Based Planning Leads to the 5 Immutable Principles of Project Success

1. What does **Done** look like in units of measure meaningful to the decision maker?
2. What is the **Plan** to reach **Completion** at the needed time for the needed cost with the needed capabilities?
3. What are the resources to deliver the **Capabilities** needed to accomplish the **Mission** or fulfill the **Strategy**?
4. What **Impediments** will impact the probability of success, and what are their handling strategies?
5. How will the **Physical Percent Complete** be measured for progress to plan?

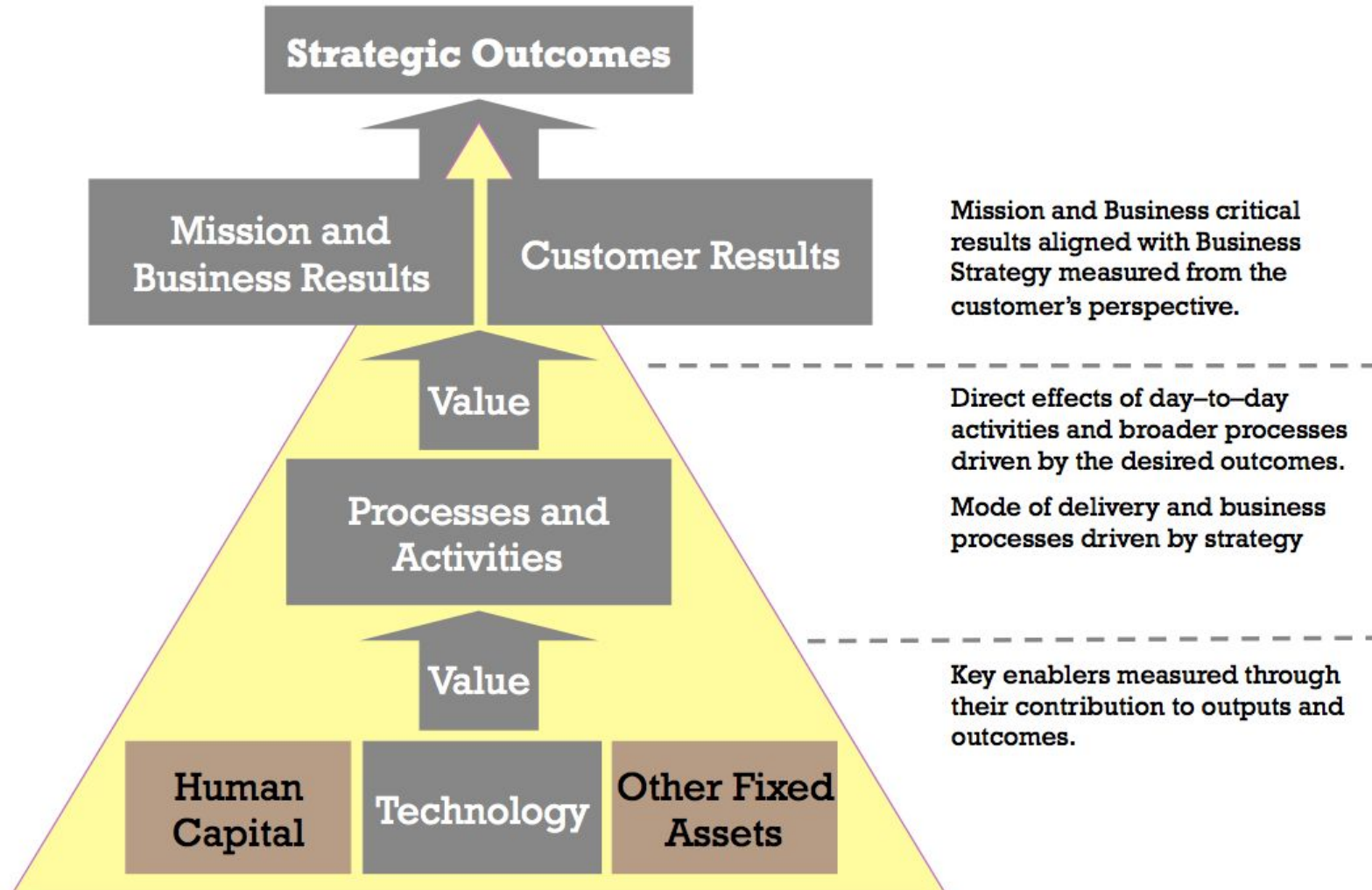




Putting these Principles to Work



CBP is Anchored on Producing Strategic Outcomes



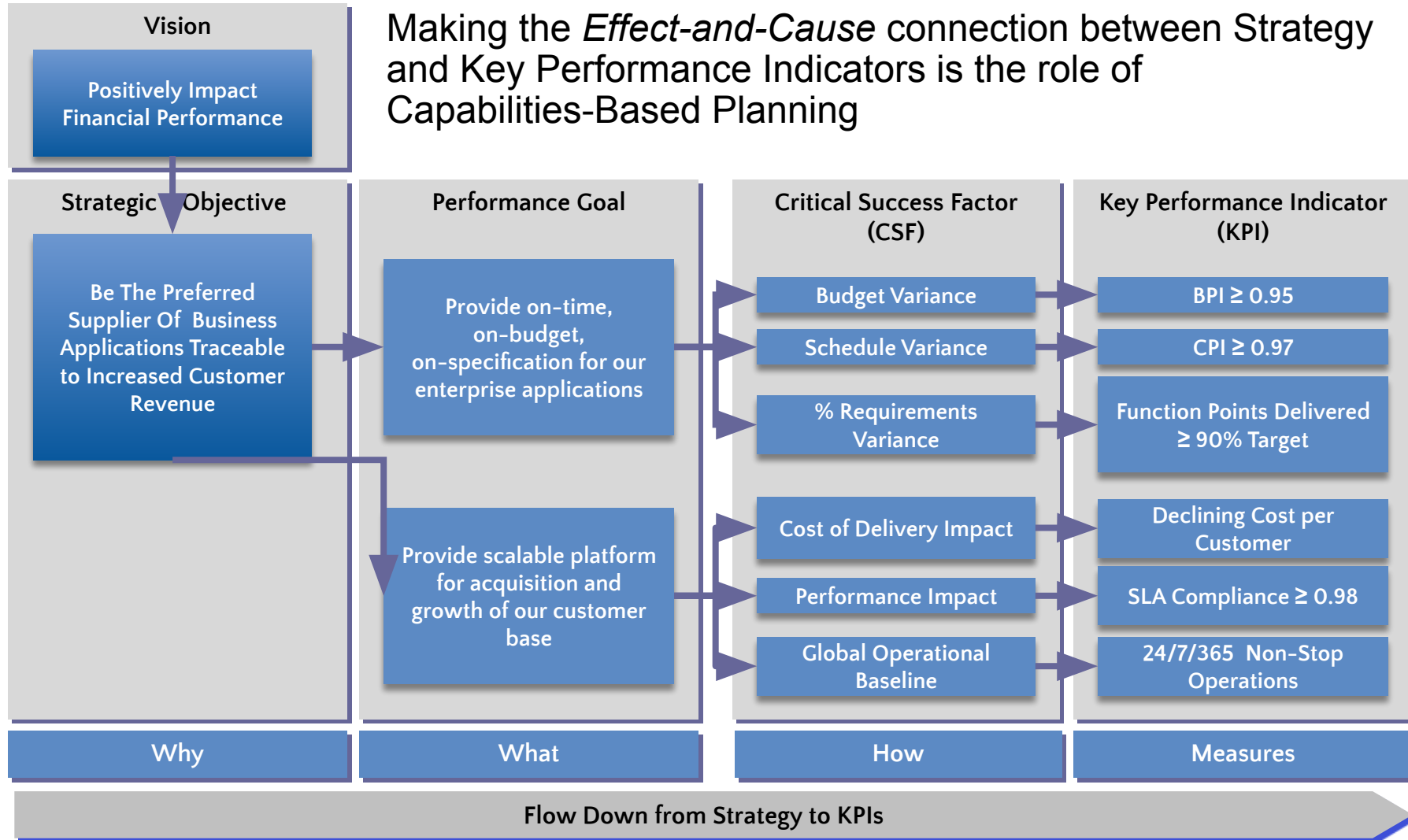
Strategy Making is the Starting Point of Program Success that answers the Question ...

To Achieve our Objectives, what Capabilities must we Possess?

- Capabilities are not the same as Features and Functions.
- They enable
 - Demands to be met without explicit specification of the solution
 - The ability to affect an outcome, react to an input, or change an effect



Connecting Capabilities to Strategy



Key Elements of Capabilities-Based Planning †

- Transforms the delivery of Features and Functions into the delivery processes supporting the strategy to accomplish the Mission
- Understanding of the needed capabilities to accomplish the Mission or fulfill the Strategy
- Assess the capability options at the level of mission or operations
- Chose capabilities levels and capability options in an integrative portfolio framework under factors of risk and economic limitations

† "Analytical Architecture for Capabilities-based Planning, Mission System Analysis, and Transformation," Paul K. Davis, RAND Corporation, National Defense Research Institute



Before Moving to the Next Step

Solutions ... “should always concentrate on the whole and not on assembling parts.

All the great principles have one thing in common. They are simple. After one realizes such a simple but profound principle, one can not stop wondering how one survived without its knowledge.”

– *The Timeless Way of Building*, Christopher Alexander, Oxford University Press, 1979.



What Does a Capability Sound Like?

These are Actual Capabilities-Based Planning Statements



We need the capability to fly 4 astronauts to the International Space Station, dock, stay 6 months, and return safely. – Crew Exploration Vehicle (Orion) RFP won by Lockheed Martin



What Does a Capability Sound Like?

These are Actual Capabilities-Based Planning Statements



We need the Capability to change the Wide Field Camera and the internal nickel hydride batteries, while doing no harm to the Hubble Space Telescope. – Frank Cepollina NASA



What Does a Capability Sound Like?

These are Actual Capabilities-Based Planning Statements



We need the Capability to control the Hell Fire Missile with a new touch panel while maintaining existing navigation and guidance capabilities in the helicopter – RFP won by Honeywell Aerospace, Phoenix Arizona



All Project Success Starts with CBP

Describing What Done Looks Like in Units of Measure Meaningful to the Decision Makers

- What Capabilities do we need possess to accomplish our Mission or fulfill our Business Strategy?
- What are the Measures of Effectiveness (MOE) and Measures of Performance (MOP) for these Capabilities?
- What Technical Performance Measures (TPM) are needed for each deliverable to fulfill each MOE and MOP of each Capability?



Measures of Effectiveness (MoE)

Operational measures of success that are closely related to the achievements of the mission or operational objectives evaluated in the operational environment, under a specific set of conditions.

Measures of Effectiveness ...

- Are stated in units meaningful to the buyer,
- Focus on capabilities independent of any technical implementation,
- Are connected to the mission success.

MoE's Belong to the End User



Measures of Performance (MoP)

Measures that characterize physical or functional attributes relating to the system operation, measured or estimated under specific conditions.

Measures of Performance are ...

- Attributes that assure the system has the capability and capacity to perform,
- Assessment of the system to assure it meets design requirements to satisfy the MoE.

MoP's belong to the Program – Developed by the Systems Engineer



Technical Performance Measures (TPM)

Attributes that determine how well a system or system element is satisfying or expected to satisfy a technical requirement or goal

Technical Performance Measures ...

- Assess design progress,
- Define compliance to performance requirements,
- Identify technical risk,
- Are limited to critical thresholds,
- Include projected performance.



Key Performance Parameters (KPP)

Measures that Represent the capabilities and characteristics so significant that failure to meet them can be cause for reevaluation, reassessing, or termination of the program

Key Performance Parameters ...

- Have a threshold or objective value,
- Characterize the major drivers of performance,
- Are considered Critical to Customer (CTC).

The acquirer defines the KPPs during the operational concept development –
KPPs say what DONE looks like



Putting This Advice to Work

For project success we must know what **Done** looks like in units of measure meaningful to the Decision Maker

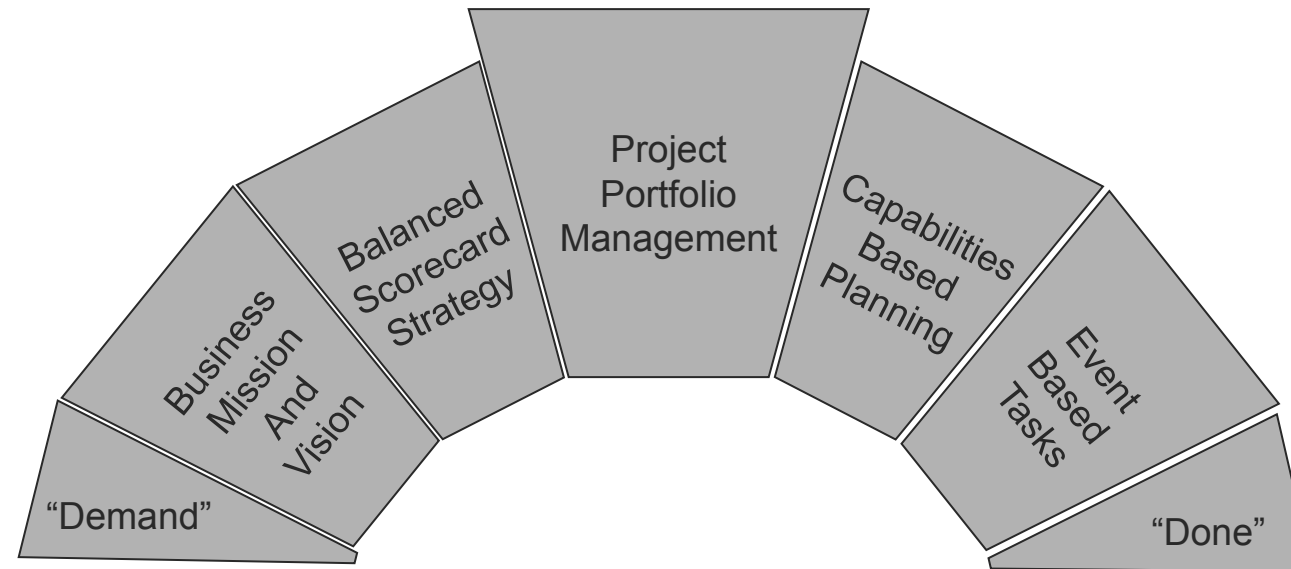
*These Measures of Effectiveness and Measures of Performance
Start with Systems Engineering*



- Define the System Capabilities first,
- Only then define Requirements, Plans, Risk and Performance Management targets and goals.
- Then adjust each of these for risk created by Reducible and Irreducible Uncertainty.



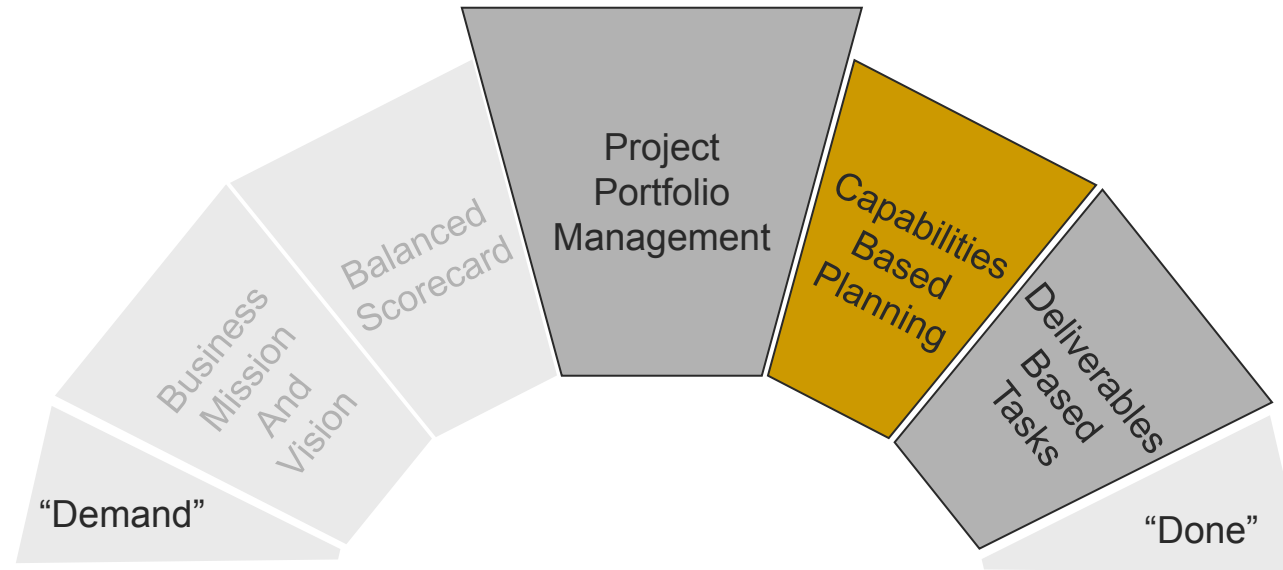
“End to end” delivery of Enterprise Solutions rests on the keystone of Project Portfolio Management, balanced by a Scorecard and a Capabilities Plan



- Business Mission and Vision drives capabilities need
- Balanced Scorecard defines the testable strategies for delivering business value
- Capabilities Based Planning defines business outcomes
- Event based tasks are the basis of increasing capabilities maturity



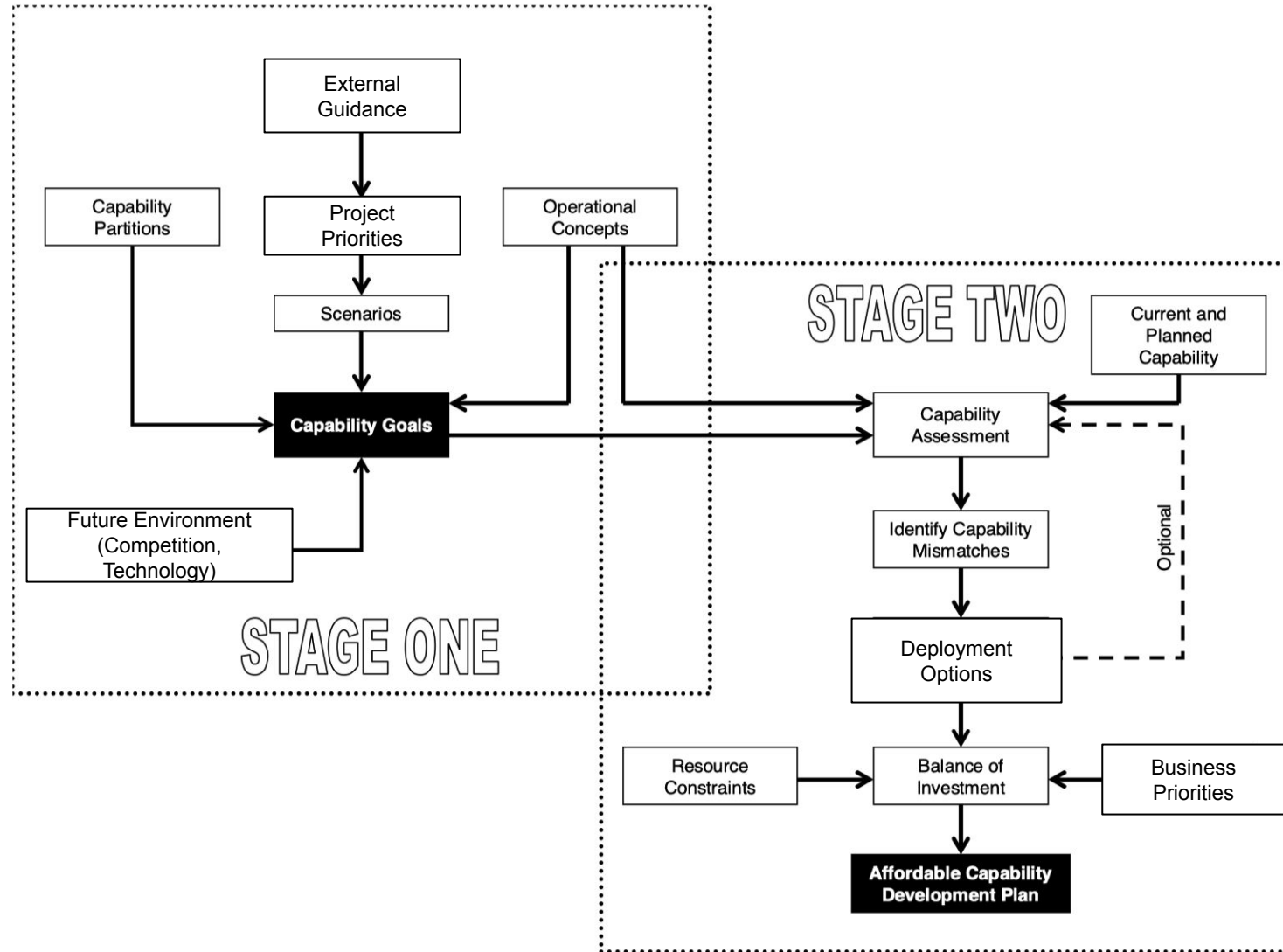
The supporting elements must be in place to enable Capabilities Based Planning to succeed. This presentation focuses Capabilities Based Planning



- Project Portfolio Management defines the “trade space” for decisions that impact value of the work needed to produce a *business capability*
- Capabilities Based Planning defines business outcomes resulting from these decisions
- Deliverables based tasks are the mechanisms for increasing maturity of the capabilities



Stages of a Capabilities-Based Plan



1st Stage of Capabilities Based Planning

- The 1st Stage takes an outward—looking strategic *top-down* perspective of the demands of the business environment
- Capability Goals are statements, in specific measurable terms of the desired level of capability to meet a needed priority or objective
- Scenarios built to determine factors that warrant consideration in planning and surface concerns



2nd Stage of Capabilities Based Planning

- The 2nd Stage takes a bottom–up view to assess the performance of the current system with respect to capability goals to inform remedial action
- Comprehensible identification of capability gaps, including deficiencies and excesses
- The final step generates capability options to mitigate gaps and assessment of each option's cost, schedule, and risk



Capabilities Based Planning is understood at the execution level, but needs to be raised to the level of enterprise process analysis

1. Identify a needed capability in operational requirements terms;
2. using the set of capability options to;
3. assess the effectiveness in an operations paradigm, and;
4. make choices about requirements and ways to achieve the capability using an integrated portfolio framework;
5. to produce of output set of options based on these operational paradigms.



Six trusted friends of a project-based organization are the basis of capabilities-based planning

Why are we doing this?	Program Mission or Strategy
What is it we're doing?	Program Deliverable
How is this going to be accomplished?	Program Accomplishments
When will we know it is done?	Program Events
When will we be done?	Scheduled Tasks
Who going to do the work at what cost?	Resources
Where will the work take place?	Teams



A Final Reminder Capabilities-Based Planning ...

Is Planning under uncertainty, to provide capabilities suitable for a wide range of challenges and circumstances while working within an economic framework that necessitates choice

– Paul K. Davies, *Analytical Architecture of Capabilities-Based Planning, Mission-System Analysis and Transformation*, MR-1513-OSD

