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Bridging the Gap Between Research and Practice: Building an Enterprise Knowledge Translation System to Optimize Military Healthcare

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Systems Engineering + Knowledge Translation

Systems Engineering (SE) provides the mechanism to develop a consistent system-of-systems approach for Knowledge Translation (KT)

KT is a standardized yet adaptable process that aims to identify and bridge the gaps between medical research and clinical practice

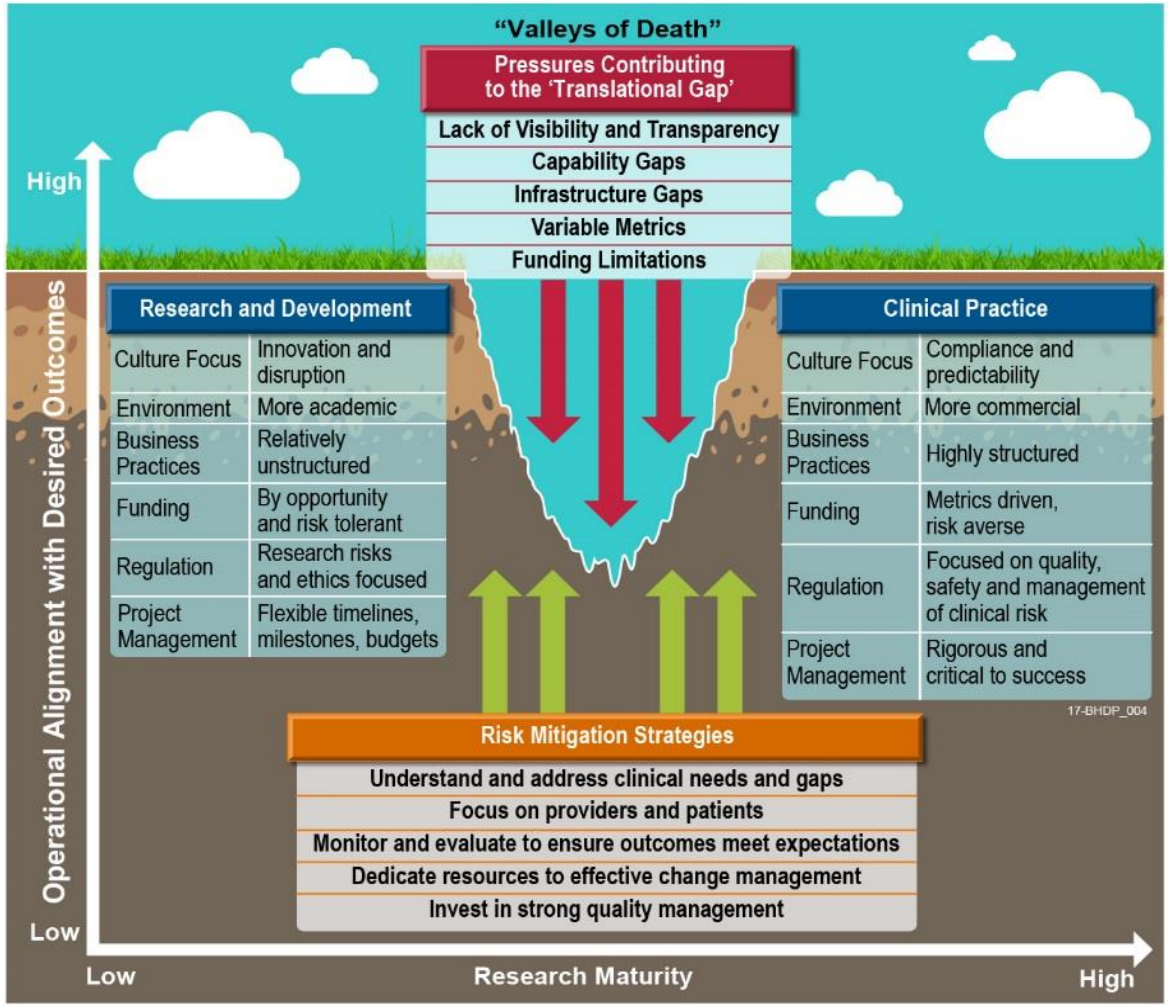
What's the Problem?

"It takes 17 years to turn 14 percent of original research to the benefit of patient care."

– David Chambers, National Cancer Institute

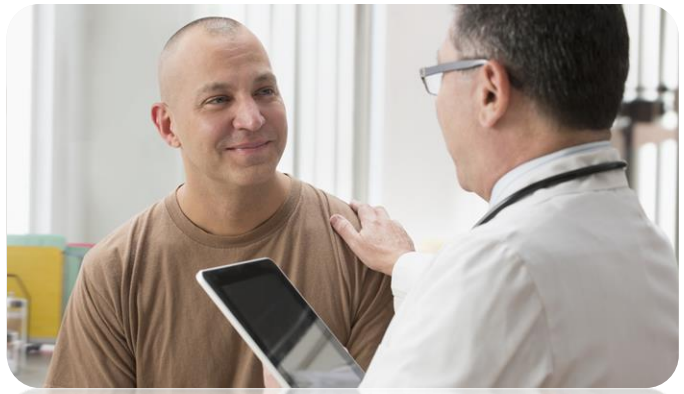
In the Military Health System (MHS), the pattern is the same:

- KT processes are variable and inefficient
- Many solutions lack a demonstrable return on investment
- Data on system performance are often absent or inadequate



Meet the Military Health System

- The Military Health System (MHS) is a global organization serving 9.4 million beneficiaries, including active duty Service members, retirees, and dependents
- Care environments range from traditional hospitals to ships and aircraft to austere field environments and humanitarian missions
- TRICARE also provides funding for private sector purchased care



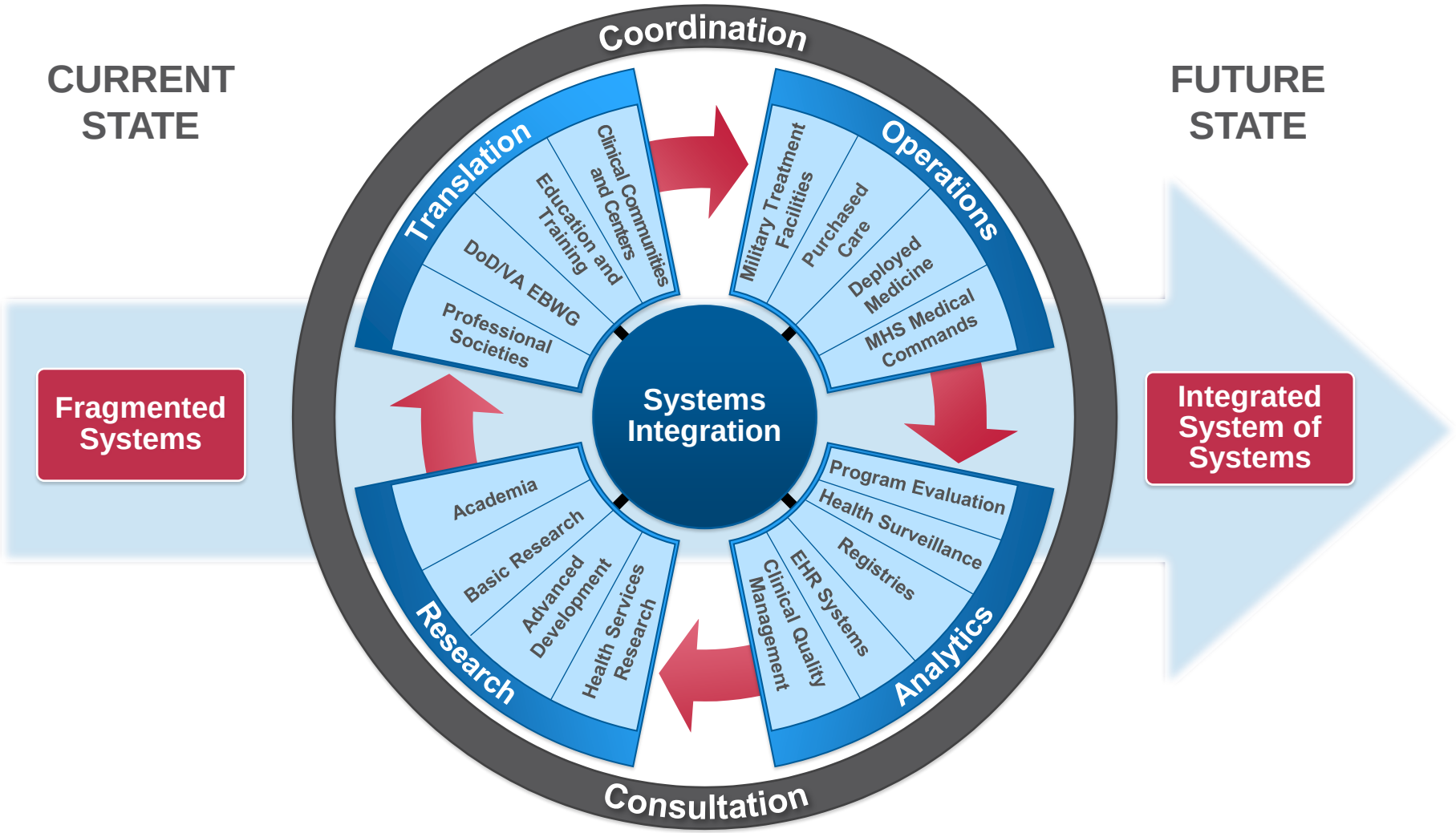
A Complex and Changing System

- The Department of Defense (DOD) funds research, builds and buys solutions, trains and equips providers, and employs and insures the patient population
- MHS is composed of a web of interrelated systems operated by the Defense Health Agency (DHA) and military Service branches (Army, Air Force, Navy/Marine Corps)
- MHS is changing rapidly:
  - DHA will begin managing all military hospitals in October 2018
  - MHS GENESIS combines more than 50 data systems and is being rolled out as a centralized electronic health records (EHR) system
  - Calls for increased integration and modernization across DoD and the Department of Veterans Affairs are abundant

SE +KT

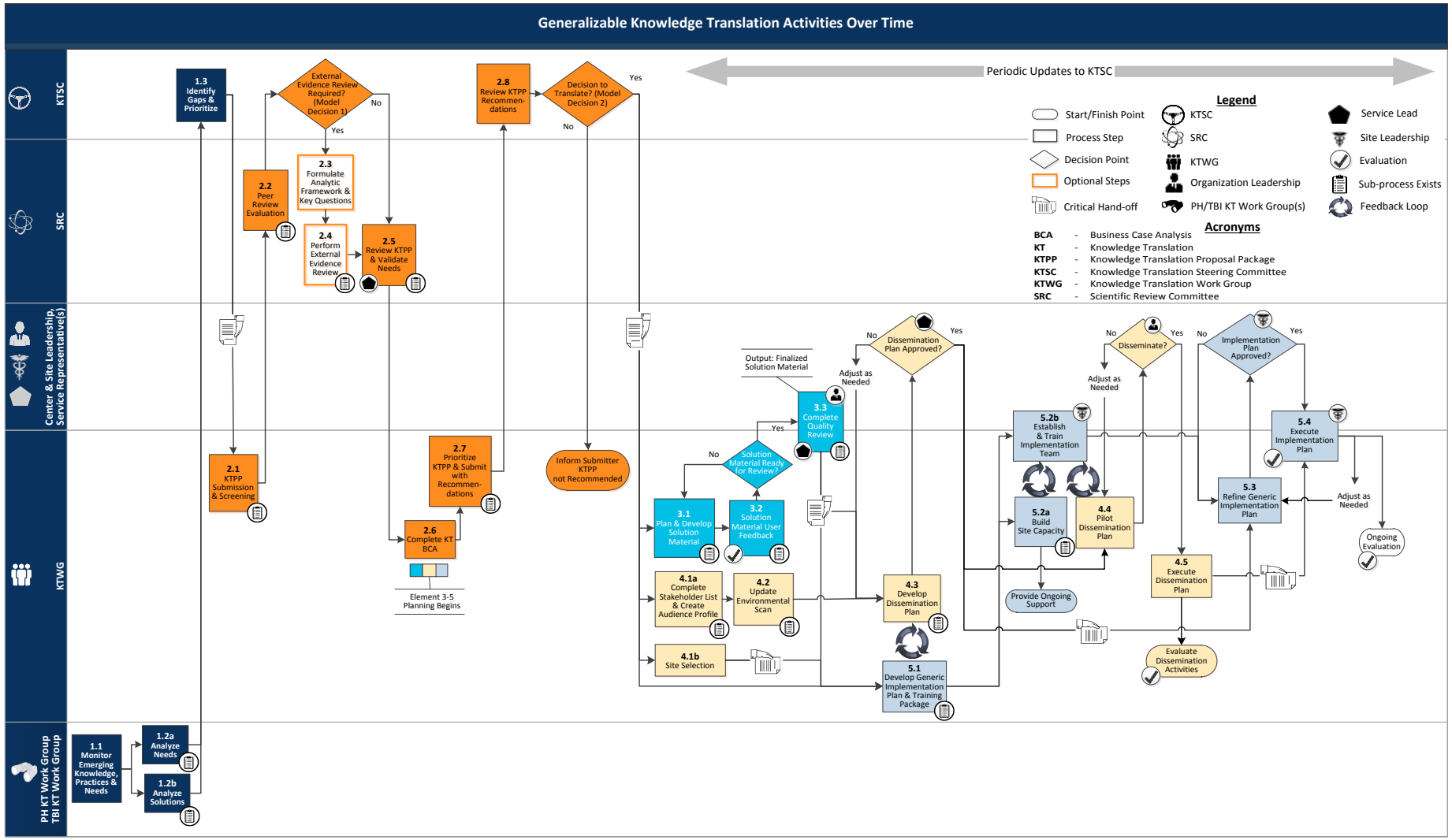
SE approaches provide a way to break down complexity and overlay KT best practices across MHS's fragmented systems to drive integration and efficiency that will get evidence-based tools to providers faster, thereby shrinking the research-to-practice gap.

Conceptual Approach to Systems Integration



KT Model 1.0: Component-Level Integration

- Needs and Gaps Identification
- Strategic Analysis
- Solution Material Development
- Dissemination
- Implementation
- Evaluation and Monitoring



KT Model 1.0: Core Elements

Element 1: Needs and Gaps Assessment uses a systematic process to actively monitor research developments, clinical best practices and operational requirements in order to identify and prioritize evolving needs, emerging solutions and current gaps.

Element 2: Strategic Analysis begins with the submission and review of proposed ideas, solutions or innovations that address identified gaps. A business case is built using available evidence, expert opinions, and cost and feasibility estimates.

Element 3: Solution Material Development describes how materials are developed, refined and approved to support translation of the knowledge solution identified in the Strategic Analysis process.

Element 4: Dissemination involves sharing of the solution with target audiences through planned strategies, including defining target audiences, selecting communication channels, environmental scans, and customization of materials.

Element 5: Implementation seeks to integrate a solution into operational practice to produce individual and organizational behavior change required to achieve ultimate outcomes. Planning is phased to allow piloting, refinement, and scaling.

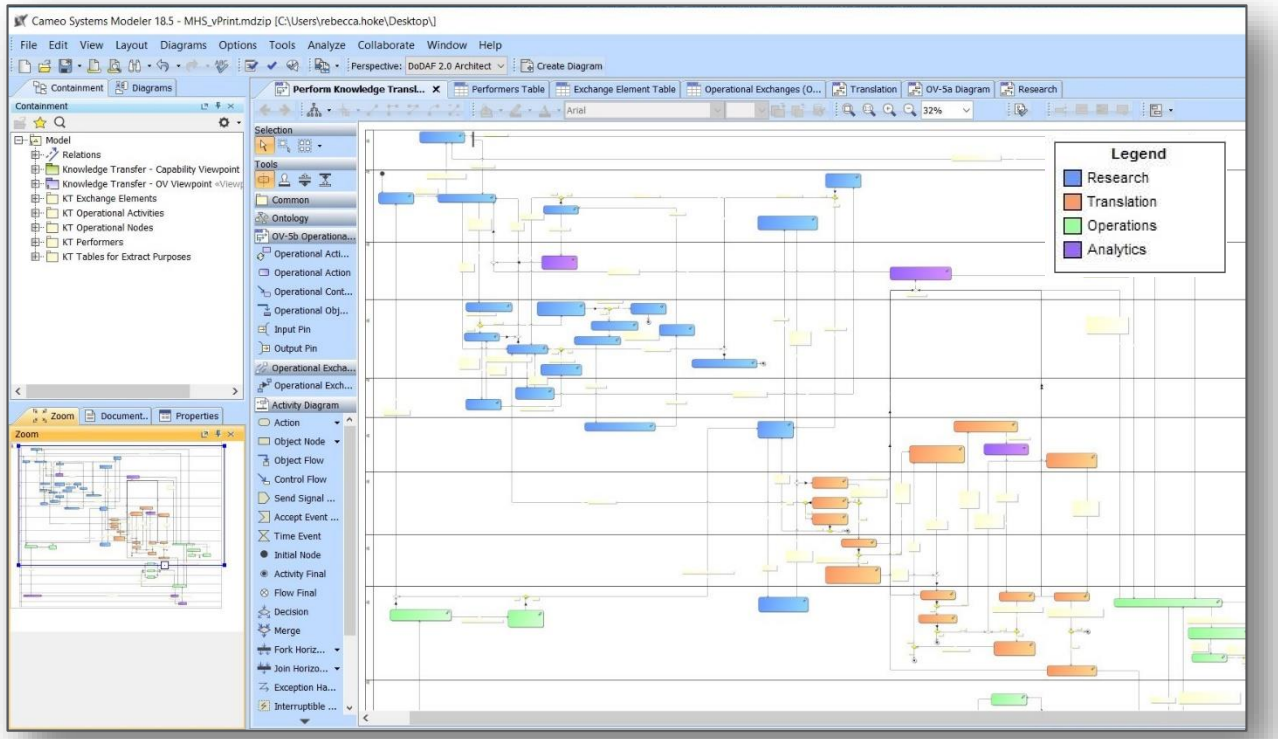
Evaluation and Monitoring of the effectiveness and impact of the model, processes and knowledge solution occur throughout and include feedback loops to ensure continuous improvement.

KT Model 2.0: Enterprise-Level Integration

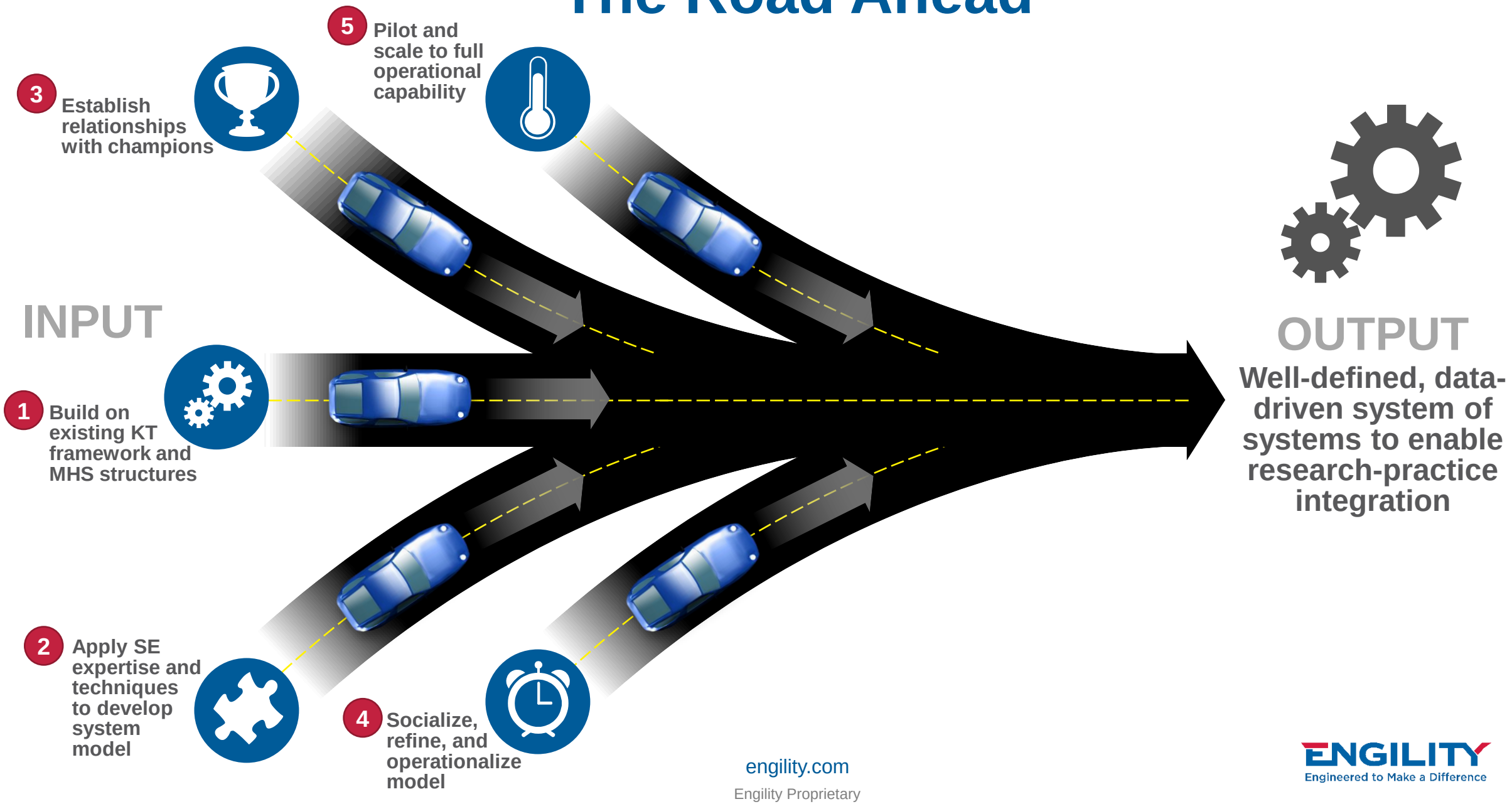
Key Features and Benefits

- Builds on well-supported KT and project management best practices encompassed in KT Model 1.0
- Incorporates SE best practices and multidimensional views through use of Cameo Systems Modeler™
- Based on DoD Architecture Framework v2.02 for seamless integration and interoperability with existing technologies and systems
- Breaks down organizational complexity into generalizable model that can be tailored for specific use cases (e.g., specific solutions, system components, or clinical target areas)
- Champions and stakeholder input will be gathered from across the KT lifecycle to ensure accuracy and completeness

Research to Practice Integration (RPI) Operational Activity Model (OV-5b)



The Road Ahead



Ultimate Outcomes: Quadruple Aim

Better Care	Robust KT will enhance the quality of care by moving more research-based solutions to the field faster
Better Health	Providers adopting evidenced-based practices and tools will improve health outcomes for their patients
Lower Cost	Efficiency will increase by defining pathways, aligning needs with expenditures, and continuously evaluating outcomes
Increased Readiness	The latest tools and open communication between researchers and practitioners produce a ready medical force (providers) and a medically ready force (patients)

Progress to Date and Lessons Learned

Key Accomplishments

- Developed and tested a generalizable KT model within one segment of MHS
- Secured buy-in from 30+ MHS R&D units on structure for advanced planning embedded within research funding process
- Supported several projects related to mobile health technology, behavioral health, and traumatic brain injury – applied KT best practices for segments of the KT lifecycle
- Engaged a team of systems engineers to detail a comprehensive enterprise organizational model for research-practice integration now being socialized across MHS

Lessons Learned

- Communication is a key to success, to manage expectations, clarify terminology, identify resources and expertise needed, and find a balance between the ideal and reality
- A flexible structure is needed to allow for changes of plans and priorities, while also permitting novel frameworks
- Champions must be engaged at multiple levels (leadership, collaborating organizations, sites) to advance implementation of new practices and overcome barriers

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