

## TRANSFORMING THE ACQUISITION VALUE NETWORK



Aerospace and Defense (A&D) organizations worldwide are increasingly discovering how a digitally transformed enterprise can accelerate innovation, deliver increased efficiencies, help address the ever-growing complexity of products and drive long-term growth. In leveraging digital tools such as modeling and simulation and the digital thread, there also exists the opportunity to implement digital engineering across the **extended enterprise value network** by focusing on four principles:

- Ensure a thorough understanding of the challenges associated with **digital transformation**. This means creating a digital Model-Based Enterprise (MBE) supported by a suite of interconnected digital technologies that communicate, analyze and use data to drive further intelligent action back into the physical world from the digital realm and thus, improve the operating model across the organization in the long term.
- Determine the best methods for preparing a large-scale transformation initiative.
- Identify the key enablers for orchestrating, governing and managing the transformation.
- Above all, in order for digital transformation to succeed, execution of the undertaking must go beyond the organization to include preparation of the entire extended value network.

Even the Department of Defense (DoD) and branches of the military are discovering how a digitally-enabled, model-based approach can vastly improve the execution of product design, development and sustainment, and thus deliver increased value to the acquisition of new systems. The Federal Aviation Administration (FAA), federally funded research centers and other government organizations are going down the same path.

For engineering-driven environments, Model-Based Systems Engineering (MBSE) is generally regarded as a critical enabler of digital transformation. In the case of DoD, Under Secretary of Defense for Research and Engineering in 2018 formalized a strategy consisting of five imperatives:



**Transform the culture and workforce** to adopt and support digital engineering across [an asset's] lifecycle.



Institutionalize the development, integration and **use of models** to inform enterprise and program decision-making.



Provide an enduring, **authoritative source of truth**.



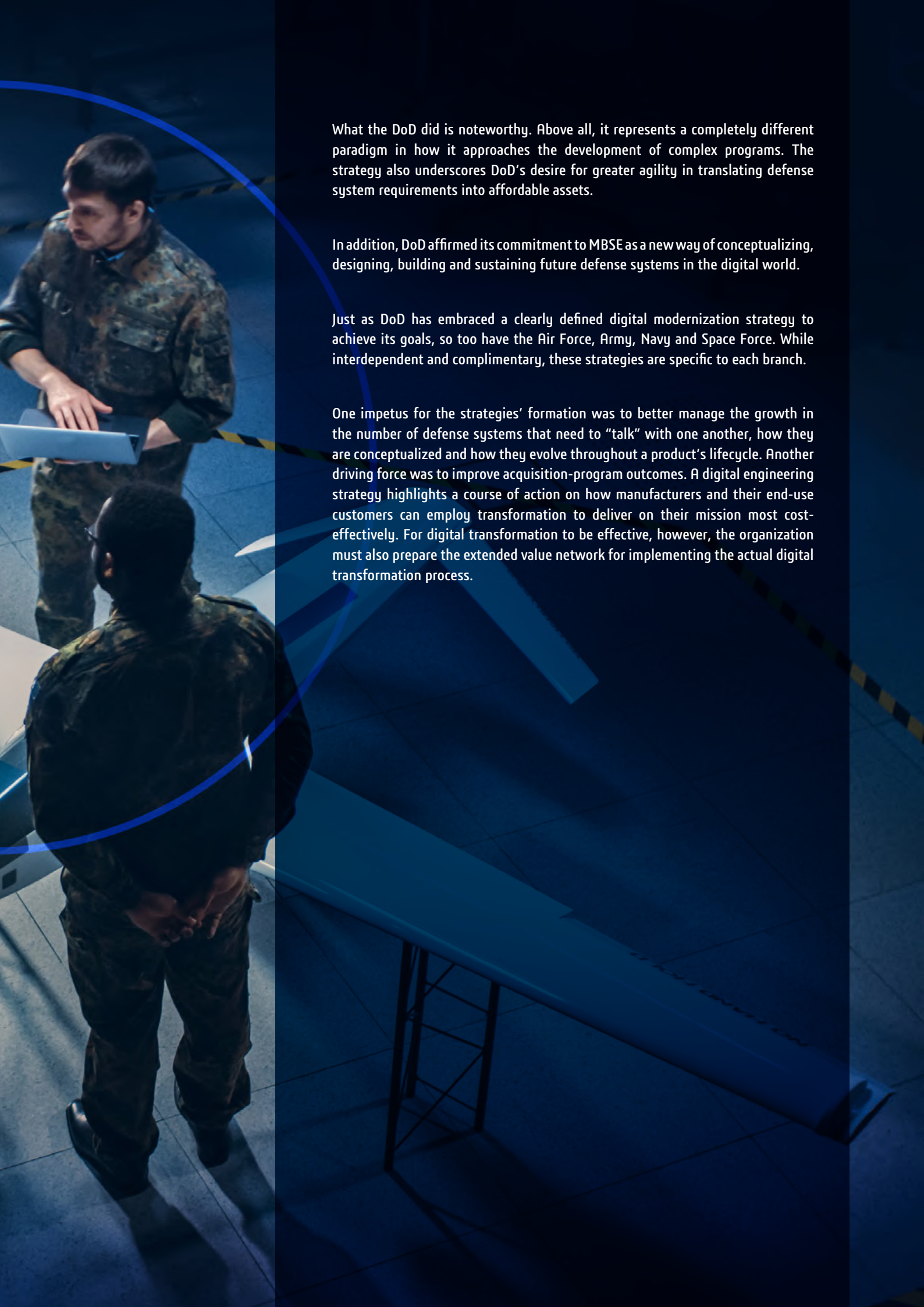
Incorporate technological **innovation** to improve the engineering practice.



Establish a supporting **infrastructure and environment** to perform activities, collaborate and communicate across stakeholders.







What the DoD did is noteworthy. Above all, it represents a completely different paradigm in how it approaches the development of complex programs. The strategy also underscores DoD's desire for greater agility in translating defense system requirements into affordable assets.

In addition, DoD affirmed its commitment to MBSE as a new way of conceptualizing, designing, building and sustaining future defense systems in the digital world.

Just as DoD has embraced a clearly defined digital modernization strategy to achieve its goals, so too have the Air Force, Army, Navy and Space Force. While interdependent and complimentary, these strategies are specific to each branch.

One impetus for the strategies' formation was to better manage the growth in the number of defense systems that need to "talk" with one another, how they are conceptualized and how they evolve throughout a product's lifecycle. Another driving force was to improve acquisition-program outcomes. A digital engineering strategy highlights a course of action on how manufacturers and their end-use customers can employ transformation to deliver on their mission most cost-effectively. For digital transformation to be effective, however, the organization must also prepare the extended value network for implementing the actual digital transformation process.

Digital transformation of a discrete **business operating model** versus transformation on a more continuous but incremental basis is more pervasive than might be immediately apparent. Organizations have been using model-based approaches since the 1970s, but they tended to strive for improvements in speed, efficiency, quality or a combination in specific domains — basically, model-augmented approaches. While this was important and had some success, model-centric approaches that DoD, original equipment manufacturers (OEMs), second- and lower-tier suppliers, and regulatory agencies are employing today are much more connected and in-depth. They're also likely to produce more enduring and integrated outcomes.

**Digital engineering** is a superset that includes model-centric approaches led by systems engineering — disciplines that are core to transitioning from document-based architecture, development, manufacturing and sustainment of products to MBSE in which models are fundamental, starting with the definition of a system or asset. This transition, while long overdue, is what enables digital connections to other design and specialty-engineering disciplines. Semantically-rich system descriptions in the model are machine-readable, enabling full digital integration across all lifecycle activities.

**A key component of a successful transformation project is buy-in of the entire workforce; their mindset and behaviors must be consistent with the goals of transforming the acquisition value network. In organizations in which employees may resist the effort because “that’s not how things are done here”, leadership will need to invest whatever time is necessary to persuasively explain to the rank-and-file why digital transformation is critical to their prosperity as well as that of the organization.**

The case for change may even go so far as to contextualize the decision to transform in terms of a **burning platform** — a business term that emphasizes the point that radical change in people’s thinking only comes when survival instincts trump comfort-zone instincts.

The first challenge an organization faces is coming to terms with the scale of change necessary across the extended enterprise encompassing technology, human behaviors and political dynamics to successfully implement digital transformation. The challenges associated with such change manifest themselves in the form of **wicked problems** — social or cultural problems that appear exceedingly difficult or impossible to solve, typically because of their complexity.

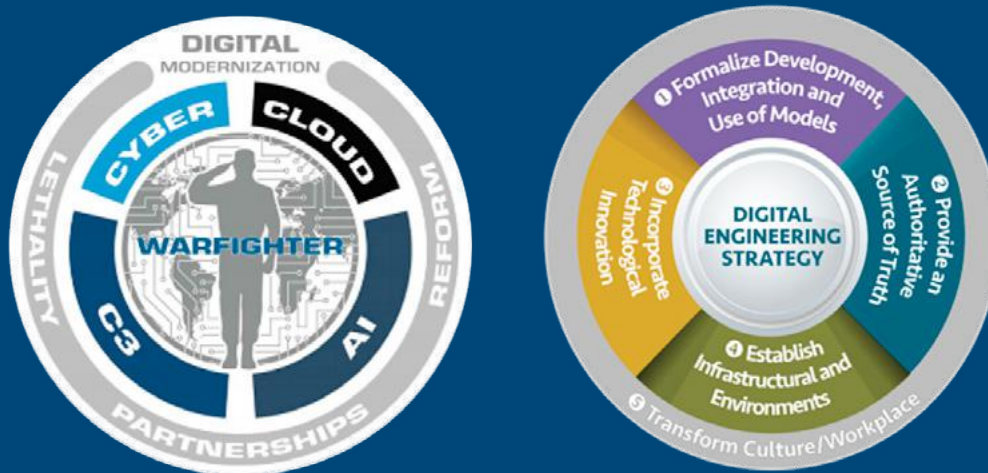


Figure 1: DoD Digital Modernization Strategy 2019 & OSD Digital Engineering Strategy 2018

Depending on how well it’s rolled out, an operations strategy with digital engineering at its core can enhance everything from winning new programs in head-to-head competitions and program execution to lifecycle sustainment and technology transfer. Entire industries are evolving strategically, as are procedures to help establish the new operating model **execution foundations**. The more a learning organization begins to appreciate the potential operational improvements made possible by digital transformation, the greater the competitive gap between that organization and competitors that have neglected to make investments in digital transformation.

In most cases, applying **tame problem** concepts to solving wicked problems almost always fails to deliver on business- and mission-oriented goals. The question then is what is the best approach for problem-solvers tackling wicked problems to increase the likelihood of achieving the most desirable outcomes?





## EXTENDED ENTERPRISE TRANSFORMATION

Many engineering organizations may believe they are on the road to digital transformation when, in fact, they are not. For some, their idea of transformation involves little more than incorporating some digital tools and technologies into their operating model such as cloud-based computing, and expecting to see improved operational performance. However, such simple constructs do not constitute transformation. Nor will such token initiatives contribute to the goals of improving the affordability of engineered systems for DoD, the FAA and other government customers; scaling the acquisition of new assets to suit budget and performance expectations; and accelerating innovation.

Therefore, it is crucial that OEMs conceptualize digital transformation as a set of performance-driven initiatives that span the extended enterprise and include technical enablers such as modeling and simulation, digital thread and open-system architectures.

**To say that managing a transformation initiative and successfully implementing it is a major challenge would be an understatement. Configuration management must cover multiple dualities. Moreover, when they are prioritized very early in the transformation process, the execution of the transformation operating model is likely to be more disciplined. These dualities include managing waterfall as well as agile lifecycles; requirements versus features and user stories; business operating model versus IT accreditation lifecycle stages; and requirements-based engineering versus digital and model-centric requirements.**

Addressing all of these considerations early will pay dividends in the end. Failing to do so will produce confusion and frustration, limit scalability and siphon productivity and confidence in the process from both contributors and leadership.

## ASSURANCE, TRANSPARENCY AND TRUST

In recent years, some OEMs and government agencies have faced the difficult task of needing to restore the traveling public's confidence in commercial aviation's prioritization of safety above all else. Exacerbating the challenge has been the industry's need to tackle the complex integration of systems of systems in the face of tremendous competitive pressures.

Both the FAA and OEMs have taken a step back to critically assess and analyze not just acute failures, but also endemic system and human failures that have led to tragedies that otherwise may have been averted. In so doing, they are using digital and model-based engineering as well as a rededication to safety, culturally, technically and regulatory assurance to eliminate potential vulnerabilities in systems design, development and operations.

The idea behind greater **digital transparency** is to help regulators gain a more thorough understanding of how new technologies that OEMs propose to integrate into jetliners will affect the operation of the aircraft, particularly in terms of safety. Greater digital transparency will also help management and engineering teams eliminate communication gaps that sometimes hinder aircraft certification; improve risk-based oversight; ensure there's sufficient Organization Designation Authorization (ODA) independence; and promote the use of modeling and simulation. Each of these aspects are intended to effectively identify, manage and mitigate potential safety concerns that could produce unintended consequences stemming from an incomplete of increasingly complex systems.

## BUSINESS ARCHITECTURE

In preparation for developing a blueprint for how to implement digital transformation, start by exploring business considerations of both the enterprise and the extended enterprise that encompass the organization's partner relationships.

Starting with the basic business architecture of the organization, industry observers and practitioners are fond of telling management teams that they should examine business processes as they currently exist ("as is") and how they could be improved ("to be"). The problem with this perspective is that it produces **anchoring bias** — an over-reliance on information developed early in the decision-making process that may interfere with viewing newer information objectively. The result could lead to a flawed coupling of methods, processes and tools and an evolutionary approach to digital transformation in which the initiative's end state produces operational disconnect and thus falls short of leadership's aspired vision.

Fortunately, there are alternate approaches to digital transformation that can point the way toward what the enterprise needs to do to increase the likelihood of success versus how to do it. Business architects play a key role in shaping and fostering continuous improvement, business transformation and business-innovation initiatives. They decompose the business-operating model into high-level value streams, collections of operational value stream stages that contribute incrementally to the enterprise value that's created. These value stream stages need to be further refined into capabilities and processes.

Think of capabilities in terms of the functional decomposition of what the business must do to create, deliver and capture value. Processes, on the other hand, are how the business creates, delivers and captures value. The solution architecture integrates infrastructure, applications and tools to digitally connect, enable and automate the processes.

As we imagine our digitally-enabled operating model, we need to understand that transformation will likely affect communication patterns, defined as communication links in work teams according to organizational structures. This

aspect of digital transformation may call for restructuring organizational patterns to improve operation without altering functionality. Failure to provide for these emerging patterns could result in suboptimal outcomes by unintentionally constraining the future operating model.

All businesses that have core competencies and a relentless focus on these capabilities not only will sustain growth over time, but also provide a method for analyzing complex operating environments in ways that management teams can consider in the context of how to improve the overall business. Viewing the organization as a core set of capabilities opens the door to being able to visualize a variety of business ecosystems without obfuscating ways to hypothesize improved operating models in the future.

**Mapping core competencies in their entirety delivers a concise, business-centric view of the operation at its most basic level of value creation. Top management and transformation architects use the business' capabilities as the building blocks for improvement in what the business does and how it does it to achieve a successful transformation. In the interest of exploring improved quality attributes such as scalability, architects should systematically analyze business capabilities for their commonality and variability across the enterprise to avoid duplication of effort during the implementation of a transformation initiative.**

Once executives and planners have completed the capabilities map, they can identify challenges and opportunities and develop operational plans at any level. This is one approach to tackling wicked problems commonly associated with transformation.

Regardless of a business' core competencies, these defining capabilities are complementary and interconnected, and they all contribute to the creation of value of the organization and the extended enterprise. Understanding these relationships will be of immense help to decision-makers as they strive to achieve a successful transformation.

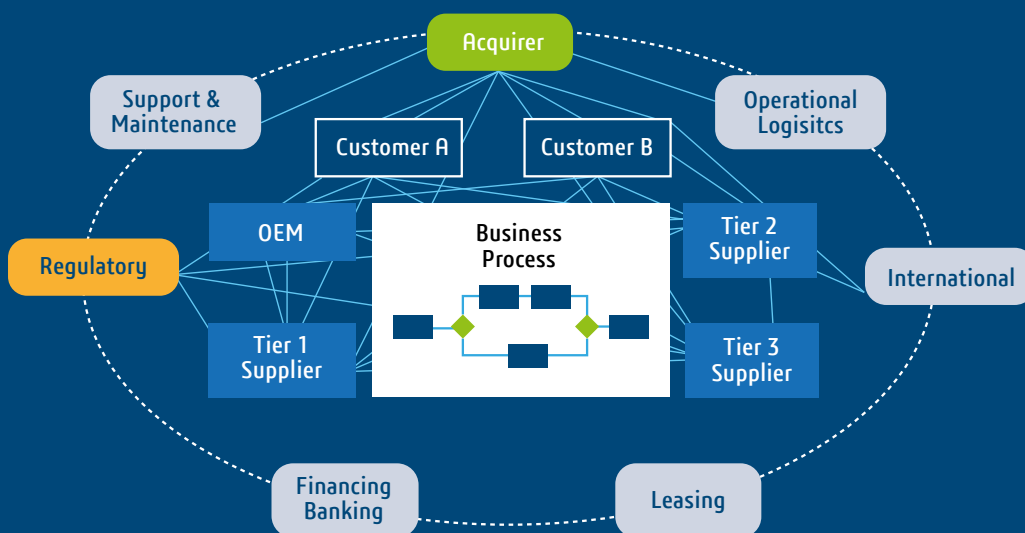


Figure 2: Representative Value Network Capability Value Topology.  
From [Business-Oriented Foundation for Service Orientation \(2008\)](#).

## VALUE NETWORK

The concept of the **value network** is directly relevant to any discussion about digital transformation on an enterprise level. In his book 'The Innovator's Dilemma', Clayton Christensen defines a value network as a collection of upstream suppliers, downstream channels to market and ancillary providers that supports a business. Moreover, he notes that it is hard for would-be disruptors to break into such networks and make big changes due to the expectation that the organization will conform to that network model.

The competitive playing field has evolved from competition not between discrete companies per se, but between networks of interconnected organizations within the context of the value network — and this defines the extended global enterprise in today's digital world. A fundamental driver of this evolution is the change in program acquisition behavior.

In the value chain, there is a sequential and linear logic to organizing the process for creating value. In the more fluid value network, the process does not have a rigid order. Rather, it works simultaneously in a network that includes explicit consideration of external organizations. In the value network geared more towards **linear logic**, there are fundamental activities in addition to key concepts of stakeholders, relationships and open innovation networks.

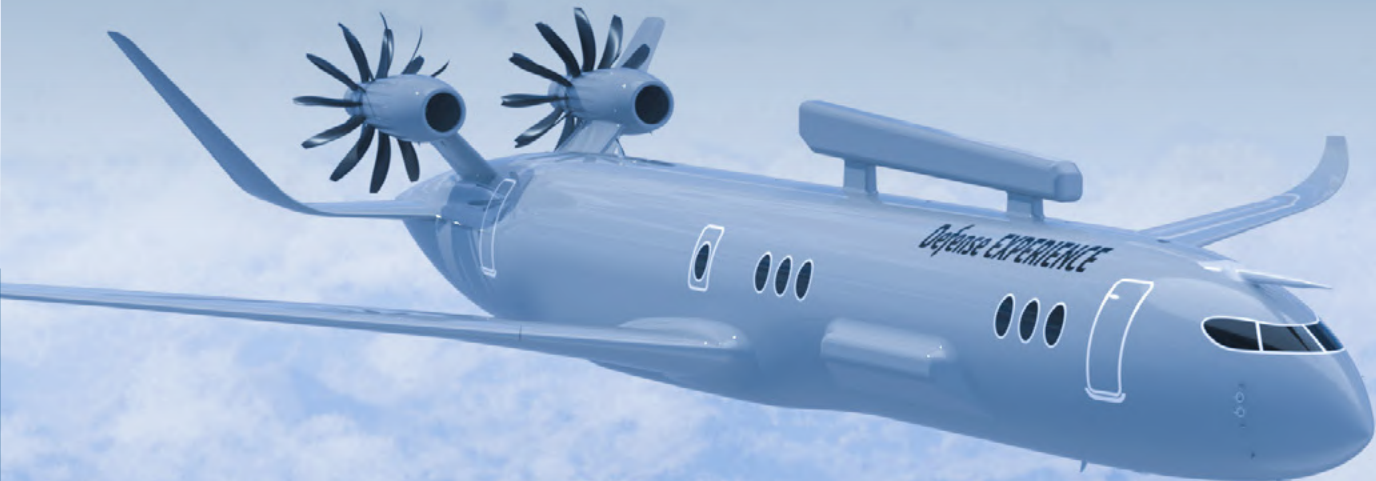
## ORGANIZATIONAL OPERATIONAL PREPARATION

A basic principle of agile is to organize around value and when it comes to digital-engineering transformation, it is crucial to identify and quantify the values which leadership expects transformation to deliver.

Start by gaining an understanding of the value matrices of the business value network. This will provide insights into key classes of values and operating patterns. It is also important to be able to understand these values relative to current and possible future business models' key characteristics, such as agility.

Furthermore, business architecture developers should analyze these values in the context of the business motivation model. Initializing this work should be a structured engagement on values, which will tee up the start of the process for transforming the organization's business architecture.

In order to effect a transformation, enterprise architects analyze the business architecture topology in advance in order to establish the transformation **Course of Action** — including **Lines of Operation** and **Lines of Effort**. They also synthesize the Lines of Operation through analysis of the overall value-creation business mapping. This includes the current business value mapping, the **Valuescape** as well as an evolving understanding of the **Futurescape**, meaning the value that the architects envision for the future enterprise and its long-term organizational success. The Valuescape and the Futurescape contribute to how the extended enterprise's operating model will be traversed (Lines of Operation), whereas the Lines of Effort describe how aspects of the extended enterprise will function seamlessly to achieve a common set of goals.



The Valuescape is the Value Class Maturity topology assessment across the Capability Value Network. Attributes of the value class for the strategic capabilities include digital, technical, operational, organizational and deployment, all leading indicators used to diagnose transformation progress. One other attribute — user — is a lagging indicator at different levels of aggregation. These include individual, organizational, program, business unit, enterprise and value network.



An assessment of the transformation initiative's most likely outcomes is crucial. Without conducting such an examination, the enterprise could return to processes and work patterns pre-dating the transformation itself. In other words, the end result could become more a product of evolution, which would be subpar, than the dramatic metamorphosis that the enterprise aims to achieve through transformation.

As with mission engineering – a methodology for identifying and pursuing the right set of capabilities, developing the right requirements, and prototyping and acquiring the right defense systems or technology – leveraging lessons learned from [outcome-driven innovation](#) provides a detailed framework for informing gross Lines of Operation and specific road-mapping input. In moving from the current state to the desired **future state**, it is essential to gain business-transformation **situational awareness**, meaning an awareness of relevant information vital to successful digital transformation.

One of the ways to look at Valuescape and Futurescape in the context of potential opportunities is to classify capabilities according to possible addressable needs. These may include unknown needs, those that are unserved and underserved, satisfied but underserved anticipated needs, and overserved.

During the course of a transformation initiative, configuration management is crucial to establishing which parts of the capability map have been covered by agile work as well as which areas will be covered next. The operational plan should be in place prior to the current and three additional Scaled Agile Framework (SAFe) program increments. The business architecture Product Breakdown Structure provides the framework for addressing transformation and change management issues and release, while the Work Breakdown Structure facilitates disciplined accountability and orchestrates the work.

The roadmap is a set of time-phased architecture views that harmonize the sequence of what the capabilities will address. Roadmaps have a much longer time horizon, with fewer details and constraints than operational plans. These roadmaps target the transformation-phasing of the business value network and associated business architecture, which harmonize urgency between the enterprise and segment levels of the business as well as important measures of goodness. Roadmaps should consider business-force architecture, development and employment holistically. In contrast, plans are far more focused on near-term development and employment.

**The planners and business architects translate their strategic aspirations and tactical requirements. This translation is key since it lies at the nexus of strategic and tactical concerns. It is a process that demands skilled leadership, political discourse and structured debate to prioritize and balance concerns pertaining to resources, not least of which is time.**

Initially, the transformation initiative produces strategic guidance on the Course of Action (CoA), based on leadership priorities and decisions. The CoA includes specific Lines of Operation and Lines of Effort that provide high-level connectivity to reach the desired outcome. During the implementation, planners' and business architects' thinking inevitably will evolve, driven partly by politically-augmented considerations that will affect priorities tied to the roadmap and the longer-range Course of Action.

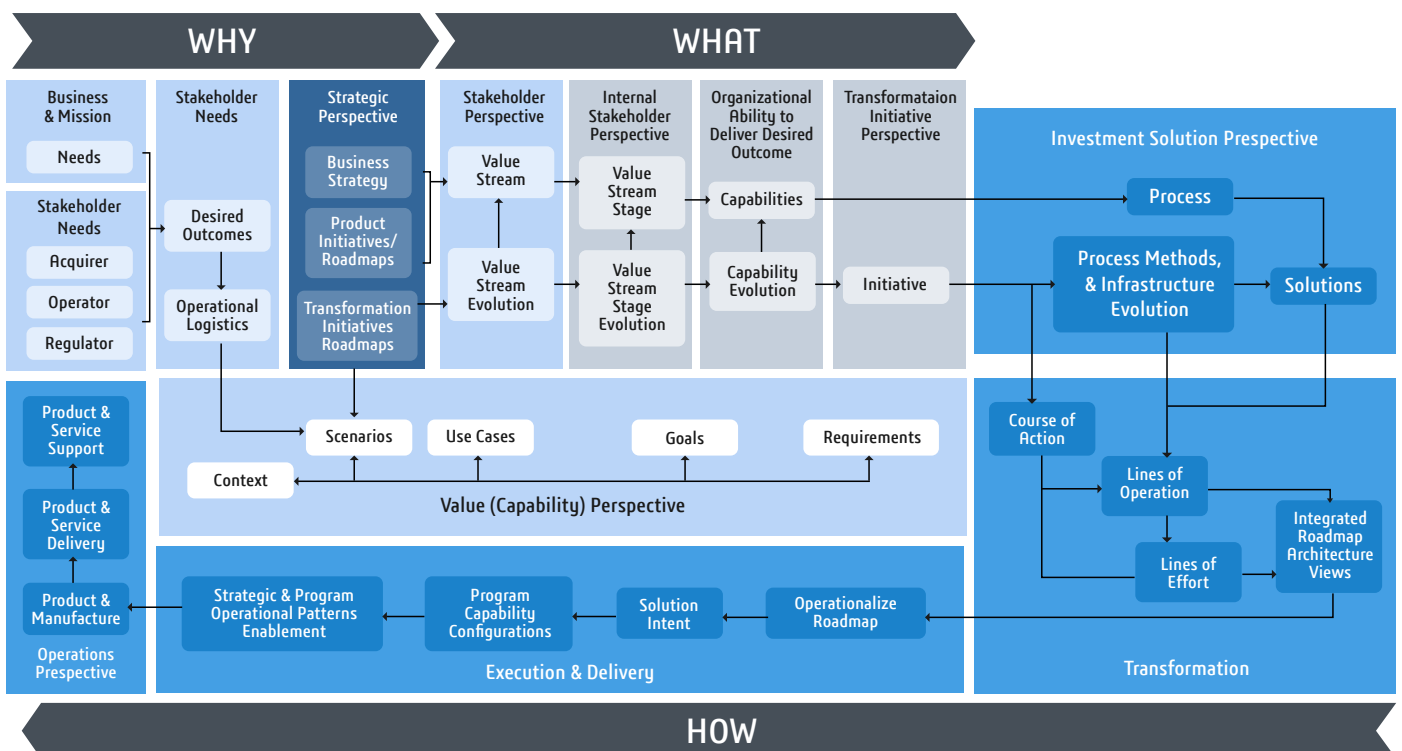


Figure 3: Illustration of some key transformation 'Why? What? How?' concepts. Evolved from [A Business-Oriented Foundation for Service Orientation](#).



## OPERATIONAL DOMINANCE

There are two main operational dominance classes: discrete operational patterns and **enterprise impact** patterns. As part of any transformation, it is worthwhile to consider patterns or operational archetypes as one surveys possible future opportunities across the Valuescape. These potential opportunities exist because of the value that the implementation team can create and deliver across the business-operating model.

Imagine there is a set of value dimensions that the business uses to assess future capabilities for evaluating value opportunities associated with future **operational dominance**. The operational patterns correlate to reduced latency, increased throughput, a reduction in errors and improved decision-making — all highly desirable outcomes from a successful transformation.

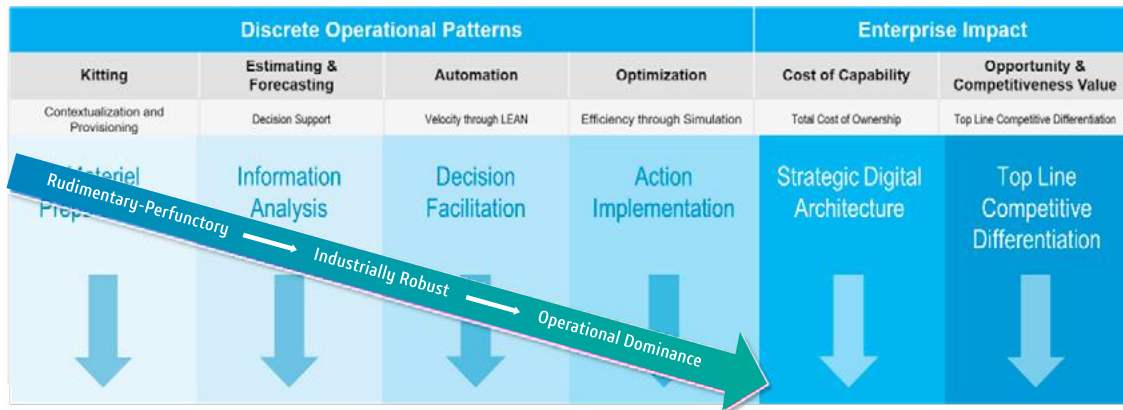


Figure 4: Operational Dominance Discrete and Enterprise Impact Patterns

### DISCRETE OPERATIONAL PATTERNS



#### Kitting – Material preparation

Providing contributors what they need when they need it.



#### Estimating and forecasting – Information analysis

Providing situational awareness, including course and direction of future outcomes from current data and predictive models.



#### Decision-making

Decision support based on historical data and decisions and improved data science insight to inform the judgement and wisdom of managers leading the implementation.



#### Implementation

Establishing as soon as possible an implementation approach and a realistic timeline for completing the project once the transformation initiative and change are underway.

### ENTERPRISE-IMPACT OPERATIONAL PATTERNS

#### Cost of capability

How synchronized is the information technology strategy with the extended enterprise's strategic goals? The shortest path may be a "glue" architecture that binds best-in-class tools together. However, a more strategic approach may produce an outcome in which the maintenance and migration of integrations are proportional to  $N$ , whereas the standalone-tool approach will produce an outcome more proportional to  $N^2$ . Analysis of the architecture and its sustainable implementations are key to enabling operational dominance in terms of deployment cost and time as well as agility in migration.

#### Competitive Differentiation – Top-line impact

In the commercial arena, it is one thing to be able to create products and deliver services faster and with greater margins. It is an entirely different matter to produce products and provide services that are in high demand. In defense markets, business success is defined by a contractor's ability to meet the customers' demands for quality products on time and on budget and sustain them affordably across the product's lifecycle. In commercial space, it is all about disrupting or being disrupted.

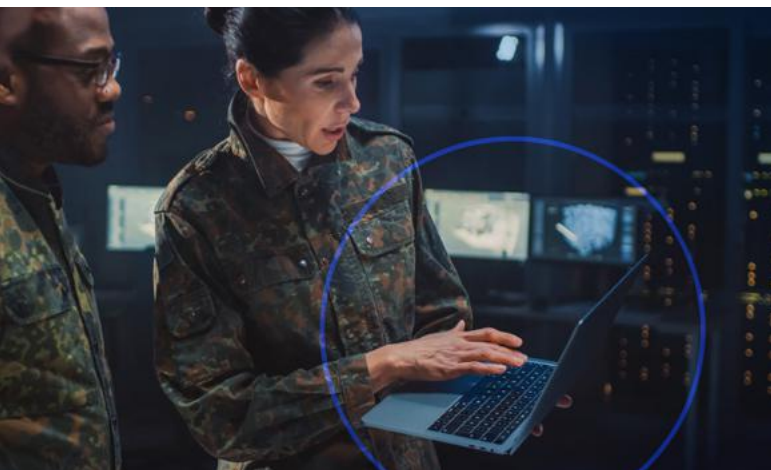
## DIGITAL THREAD AND TRACEABILITY

No concept is more vital to sustaining digital transformation and creating a model-based enterprise than the role of the digital thread — essentially, digitally connected digital data. Digital thread is the critical enabler for smart, connected products, new business models and faster time to market, and it is integral to a Model-Based Enterprise. It allows data and processes to flow across the enterprise, free from functional silos, thus enabling an organization to evaluate more alternative solutions, make better decisions more quickly and move implementation faster.

**It also enables traceability, whose utility lies in its ability to accurately track work items across a product's development lifecycle. Traceability, which pulls together all of the assets of the digitally-enabled Model-Based Enterprise, becomes especially important in managing processes and product configurations. It enables federated applications and keeping track of associated assets. Without traceability, impact analysis of many digital engineering activities would be challenging at best.**

In summary, here are some of the benefits of making full use of traceability in a Model-Based Enterprise:

- Verifies higher-level functions as well as the fulfillment of requirements.
- Identifies and assesses the possible impact of prospective alternative management decisions.
- Validates elements and assumptions in the development lifecycle, including non-functional attributes and requirements tied to architecture.
- Ensures that all safety-related requirements, including certification data, have been fully satisfied at the system level.
- Provides evidence-based assurance of a system's configuration measured against an established baseline.



In the case of untraced requirements, engineering managers should examine them closely to determine whether they are derived as part of the development process, can be tied to a related but separate requirement that was overlooked, or whether they are assumptions that need to be classified and better managed.

## ONTOLOGY

Refinement of the basic ontology — a model for describing the world that consists of a set of types, properties and relationship types, with the expectation that the features in the model should closely resemble the real world — and the associated class structure enables the foundation of the digital thread.

The incorporation of search-based technologies provides a means for enabling each of the operational patterns discussed in the 'operational dominance' section of this paper — kitting, estimating and forecasting, decision support, and implementation. The digital thread may also produce valuable information to support decision-making in such areas as determining the most desirable scope of change. The ontological relationships provide the ability to conduct higher-level operations across the extended enterprise.

Building upon the ontological foundations, it is possible to create the appropriate classification libraries to exploit information and data that can be put to practical use. Further, building on the ontology in terms of key tagging — such as who, what, where, when, why and how — provides key search-based enablement in the exploitation of knowledge.

When we move from the ontology to the [operational dominance] class, collaboration within the extended enterprise becomes bona fide teamwork on an entirely different level; it is happening across lifecycles, families of systems, and programs and acquisitions.

To leverage the full potential of the digital thread, start by understanding the power of digital empowerment and establishing the right architecture that can help structure decision-making, an organized approach to identifying and evaluating creative options, and making choices in complex situations. The idea is to gain insight about how well decision-makers' objectives may be satisfied by potential alternative courses of action. Accepted **principles** include:

- Maximize benefit to the enterprise
- Information management is everybody's business
- Business continuity is paramount
- Treat data as an asset
- Share data
- Ensure the accessibility of all data
- Manage the diversification of technology
- Secure all data
- Make ease-of-use standard operating procedure

Consistently practicing the right digital and model-based principles will help drive lower-level decisions (management, operational and process-related) and constrain successive layers in the business architecture. Using the Unified Architecture Framework — UAF defines ways of representing an enterprise architecture, enabling stakeholders to focus on specific areas of interest while retaining sight of the big picture — enterprise architects can greatly simplify the process. This is achieved by first elaborating the business using concept models and then using the UAF meta-model to incorporate the models into the UAF framework.

# CONCLUSION

As the extended enterprise ecosystem comes together, it is important that stakeholders have a clear understanding of their discrete role within the scope of the extended enterprise. It may be the best way to ensure that all players are working in unison to achieve common goals.

Some key takeaways on transforming the acquisition value network:



## Understand the case for digital transformation, including the challenges to achieve a successful implementation.

- Key stakeholders across the extended enterprise should be capable of making the case for transformation and securing unconditional buy-in at all levels.
- Establish the business architecture situational awareness of the existing Valuescape in line with the initiative's vision, mission, values, goals and objectives.
- Use futures analysis to produce a realistic Futurescape of future end-to-end business capabilities and associated process flows that reflect the most desirable operating model of the extended enterprise following digital transformation.



## Prepare for large-scale transformation

- Establish the elaborated business architecture for the enterprise and value network.
- Establish the business architecture Course of Action and associated Lines of Operation and Lines of Effort in preparation for the transformation.
- Leverage outcome-driven innovations to elicit Futurescape and Valuescape, and also to take advantage of opportunities to affect strategic, long-range architecture roadmaps and refine Lines of Operation.
- Describe each digital engineering element in sufficient detail to make it actionable.
- Apply MBSE to the architecture of the extended enterprise to understand its most crucial attributes, decisive junctures and digital principles.



## Enable the orchestration of transformation, governance and management.

- Develop a specific governance and the appropriate processes to clarify what is tactical versus strategic and what is important versus urgent.
- Develop a methodology for explicitly addressing the political and structured argumentation process for all of the major decisions that will go into achieving the most desirable transformation outcomes.
- Manage the digital transformation process using model-based best practices.
- Establish a set of extended enterprise configuration-management plans to address the inevitable dualities of transformation.
- Frequently re-examine the implementation's future state to stretch aspirations as institutional learning of the transformed extended-enterprise evolves.



## GLOSSARY

### Authoritative Source of Truth (ASoT)

An ASoT is an entity such as a person, governing body or system that applies expert judgment and rules in proclaiming the validity and legitimate source of a digital artifact.

### Capability value network

The network of business capabilities comprising business value-stream stages that enable internal and external value exchange.

### Course of Action (CoA)

A deliberate means of engaging the enterprise-capability value network to effect change, including the operational order and desired maturity outcome.

### Digital thread

The communication framework that facilitates a connected value flow using the digital data and relationships as the communication medium and integrated view of a product's data throughout its lifecycle across traditionally siloed functional perspectives.

### Enterprise-impact operational patterns

Operational archetypes that are applicable across the capability-value network that serve as a convenient framework for futures analysis, as well as a means to evaluate progress towards the defined future outcome.

### Futures analysis

Analysis conducted by leadership on the organization's direction and motivations for continuous transformation and business modernization.

### Futurescape

The established aspired future capability landscape of the operating-capability patterns that an organization uses to motivate maturity planning and execution.

### Lines of Effort (LoE)

A Course of Action transformation element that establishes the incremental capability maturity goals resulting from applied engagement actions and that which an organization needs to accomplish.

### Lines of Operation (LoO)

A Course of Action element that establishes the manner in which a transformation engagement will cover a business' strategic business-capability topology.

### Ontology

A set of concepts and categories in a subject area or domain that shows their properties and the relationships between them.

### Product breakdown structure (PBS)

Hierarchical structure of products that a development program will produce or outcomes the project will deliver. The PBS decomposes a system into its constituent parts in the form of a hierarchical structure and helps answer the question: "What are we trying to build?"

### Tame problems

Problems for which there is a closed-form single solution.

### Unified Architecture Framework (UAF)

A framework — evolved in both concept and technology from the US Department of Defense, Department of Defense and Naval Aircraft Factory — that blends business concepts and business motivational model to harmonize defense and business architectures and descriptions.

### Valuescape

The evolving extended enterprise capability-value network in which the current and future intended fielded capabilities are analyzed according to basic value classes.

### Value class maturity

Digital transformation capability-value class maturity rating, based on a scale of 0 to 5, as measured against a set of maturity objectives.

### Value network

A collection of upstream suppliers, downstream channels to market and ancillary providers that support a common business model.

### Wicked problems

A problem within the realm of policy and planning that is difficult or impossible to solve because of incomplete, contradictory and changing requirements that are difficult to recognize.

### Work-breakdown structure

Components and elements that organize and define the scope of a project, including essential tasks and associated deliverables.

**Dr. Thurston** is a Sr. Director Enterprise Transformation with 36 years of Aerospace & Defense and Security experience. He is a futurist and has affected strategic direction including the initiation of what has culminated in the acquisition of No Magic.

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