Transformation & Transition:

How Complexity is Driving Change in the Business of Supplying the DoD

Embedded Tech Trends 2020

Shan Morgan

Supplier Landscape
Defense

The Embedded Computing industry is in a state of flux as Prime Contractors and Sub-Tier suppliers try to address the demands of the changing defense market. The increasing complexity of solutions and cost pressures driven by modern electronic warfare (EW) and network centric systems has increased the need for technology advancements in; multicore processing, FPGAs, wireless, and cloud computing and putting a competitive strain on companies existing resources and capabilities.
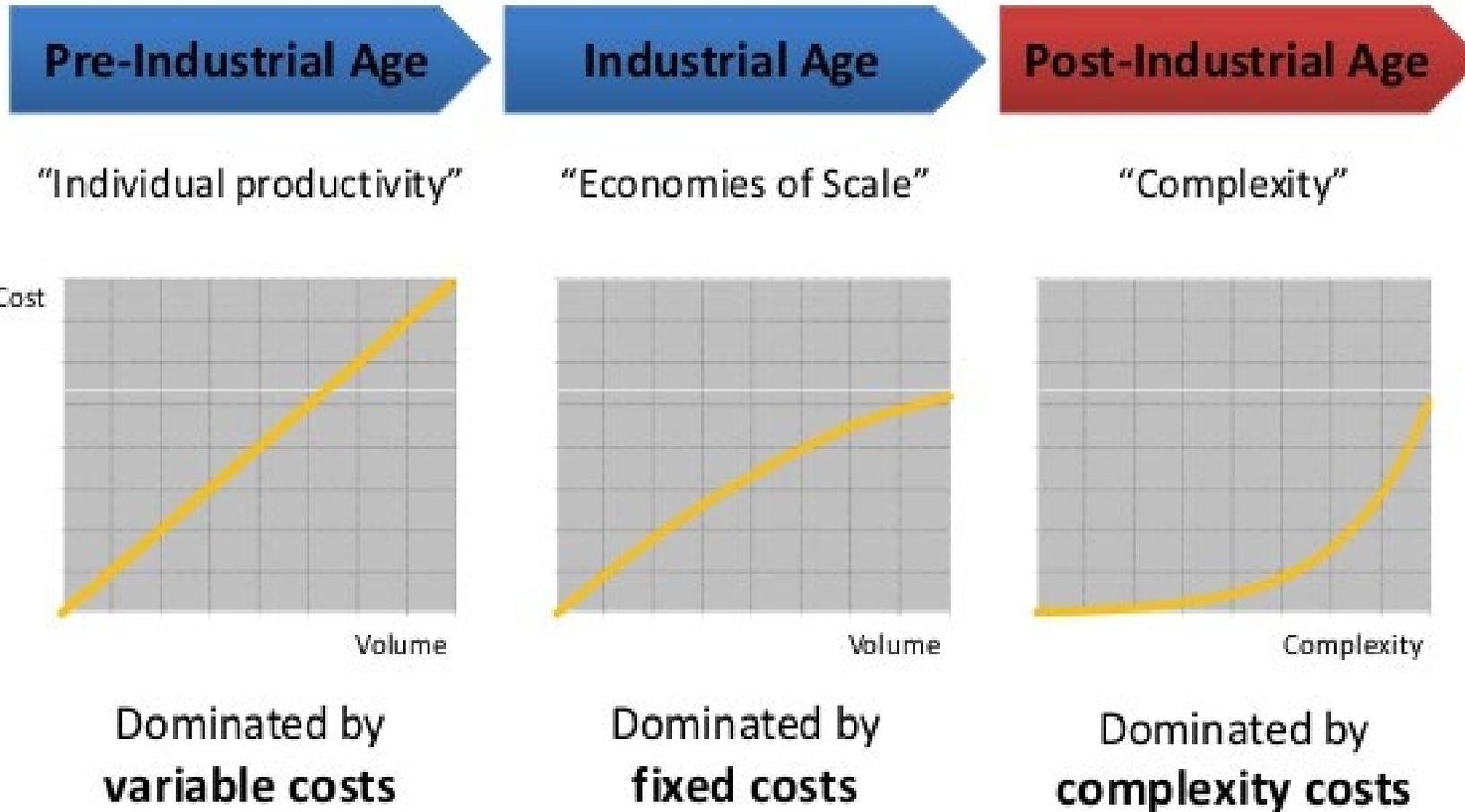
Impact on Suppliers:

- **Prime Contractors: Move to outsource technology specific content and/or entire blocks of non-value add System Platform Level Solutions**

- **System Platform Providers: Technology acquisitions to enhance inhouse capabilities.**

- **Building Block Suppliers: Focus on niche plays leveraging core competencies in; Boards, Chassis, backplanes, etc. (margin and opportunity limiting)**

- **Commercial Suppliers: Entering the market with COTs (commercial) products that support the cost and technology pace needs of C4ISR.**

- **The challenge for Companies will be to position their value in the vertical between being a full service System Platform Provider or focusing as a provider of niche products/services.**

Trytends
Defense

The global aerospace and defense (A&D) sector has experienced strong growth over the past 2 years, following multiple years of positive, but a more moderate rate of growth.

- **Cost pressures (DoD & Primes)**

- **Pentagon's push to unleash a new wave of innovation — known as the "third offset". Increases in R&D spending**

- **Increasing complexity of System Architecture interplay**

- **HPEC technology/hardware rate of change – compression**

- **Leveraging Industry content/knowhow (COTS) to support new 'open' standards (SOSA™)**

- **Adding externally developed technologies, off-the-shelf items — to improve the performance & capacity of military systems. "Consumer Technologies" – Driven by C4ISR**

- **Shift to vendors outside the 'core defense industry': shorter time frames & more agile than legacy defense companies – Exponential (not linear) technology innovation.**

- **Tier 1 Primes pushing program requirement 'ownership' down to the vendor base = Risk**

ELMA
Your Solution Partner

The world has changed!

Pre-Industrial Age | Industrial Age | Post-Industrial Age

"Individual productivity" | "Economies of Scale" | "Complexity"

Cost (Volume) | Cost (Volume) | Cost (Complexity)

Dominated by **variable costs** | Dominated by **fixed costs** | Dominated by **complexity costs**

APICS2014

**The center of gravity has moved from generalist to specialist**

For much of the 20th century, when companies had a series of individual product lines, their sales model could thrive as long as they had the right account coverage, focused to some degree on key accounts, with a crisp pitch on features and functionality. **Today, what's required is assembling the right team of experts with relevant solution knowledge at the right time (no more, no less) in the sales cycle.**

- **Customer needs have grown more sophisticated. Buyers increasingly demand a tailored solution anchored in expertise about their industry or a specific function.**
- **Customers expect providers to help solve their business problems and measure value based on outcomes, not necessarily the lowest price.**

Complexity is unavoidable, of course, yet poorly managed complexity can erode customer confidence.
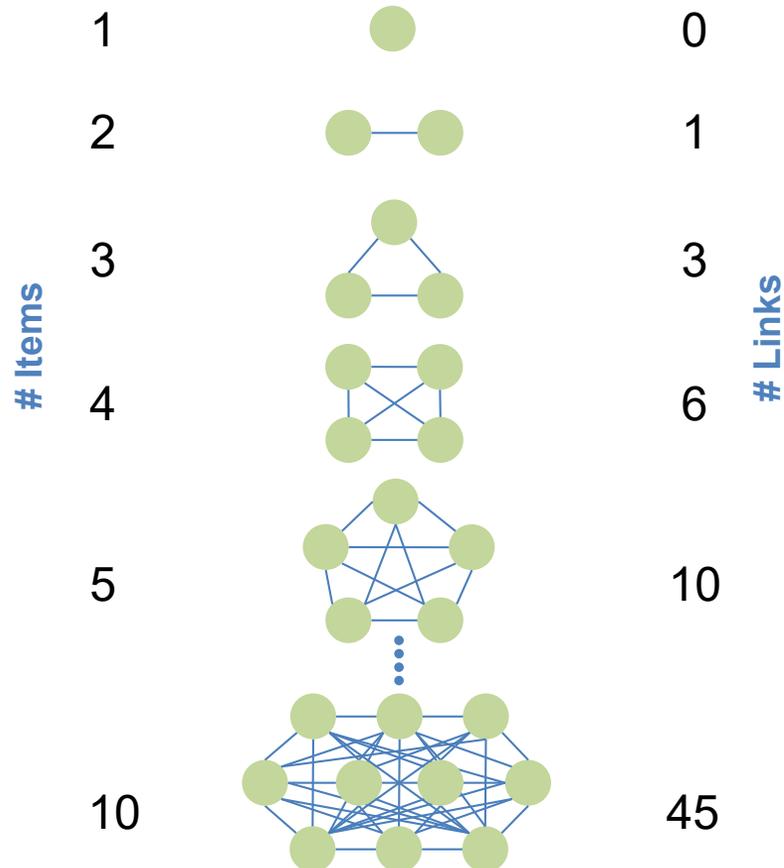
Complexity is the byproduct of an increasingly intricate business environment

ELMA
Your Solution Partner
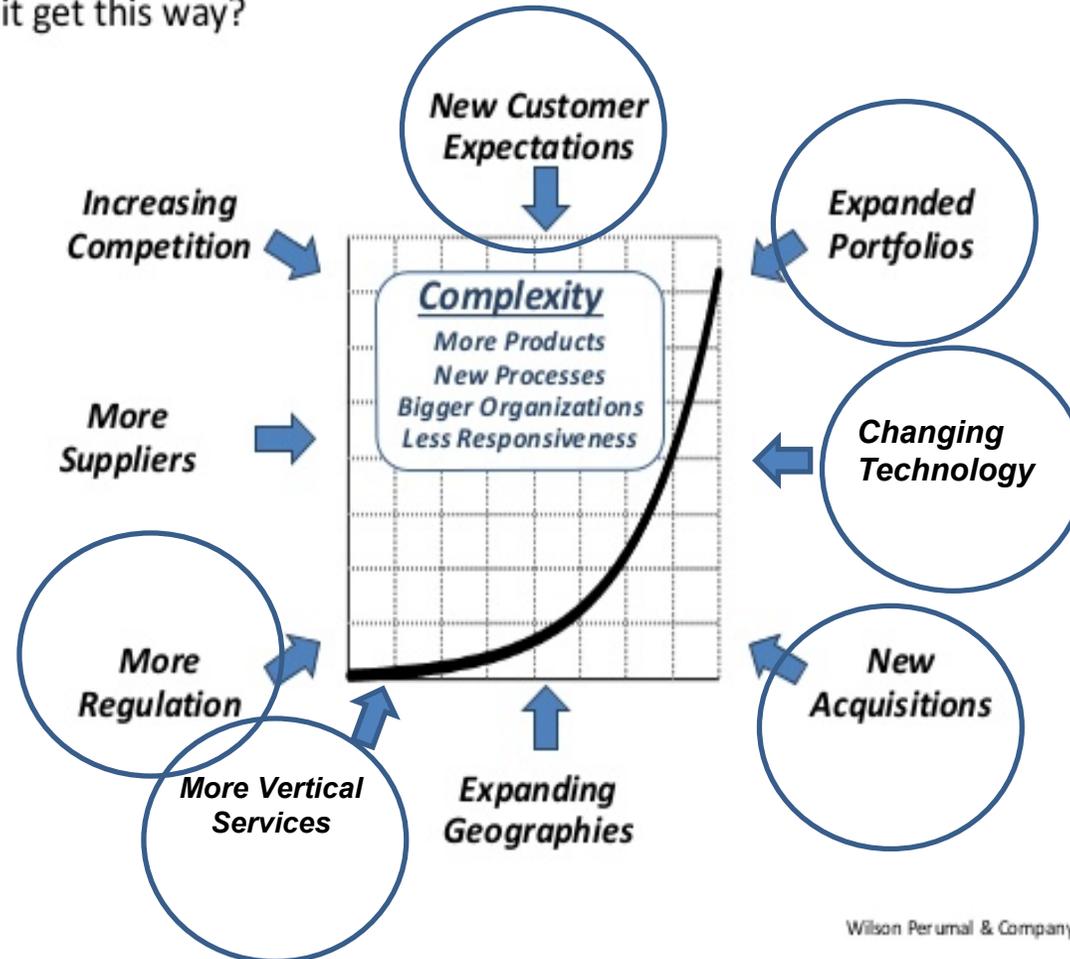
Complexity grows exponentially

The Number of Links Increases Geometrically with the Number of Items

 # Items

	# Links
1	0
2	1
3	3
4	6
5	10
10	45

Characteristics of Complex Systems

1. Non-linear reactions

2. Emerging properties

3. Feedback loops

4. Unknown interactions

These characteristics make Complex Systems almost impossible to predict and control
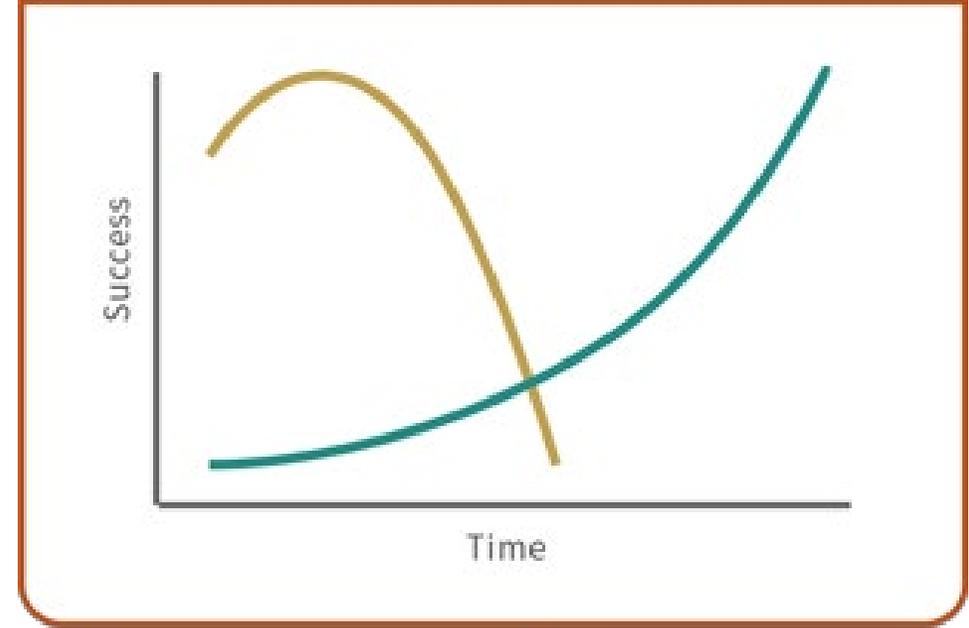
Many companies are passing a complexity threshold

Costs and operational risk grow exponentially with complexity

COST & RISK
(exponential growth)

An increasing number of companies are here

Many companies are here

VALUE
(diminishing returns)

Few companies are still here

Complexity

© 2014 APICS, All rights reserved.

APICS2014

Sales Complexity Graph

Success

Time

Simple, low value sales   Complex, high value sales

Sales Complexity Graph, Copyright Graham Smith, 2014

Complexity
Straining All Aspects of the Business

- **Sales / Program Management**
  - Compliance, change management, customer approvals, design reviews, questionnaires, surveys, etc.
- **Engineering**
  - Technology change rate, specialized resources – qualified people
- **Supply Chain**
  - Component availability, counterfeit parts, vendor selection, price increases
- **Operations**
  - Equipment, processes, yield, delivery
- **IT**
  - Cyber security – NIST, Cybersecurity Maturity Model Certification (CMMC)
- **Quality**
  - Flow-downs, Q-notes, FAI, SI, vendor qual, RCCAs
- **Finance**
  - CAPA Audits, terms, cash flow, etc.

- **The issues arising from the increasing complexity put a major strain on a Company contributing to:**
    - Less time to for business development
    - Difficulty staying current (technology, products, processes)
    - Margin erosion
    - Increase project risk
    - Increased inter-departmental conflicts
    - Damaged relationships with key customers